HYGIENE OF THE NURSERY

STARR.

SEVENTH EDITION

GENERAL MANAGEMENT OF CHILDREN·

FEEDING· DIET-LISTS·

CLOTHING· SLEEP·

EMERGENCIES·

MASSAGE·

ILLUSTRATED·

HYGIENE

OF

THE NURSERY

INCLUDING THE GENERAL REGIMEN AND FEEDING OF INFANTS AND CHILDREN; MASSAGE, AND THE DOMESTIC MANAGEMENT OF THE ORDINARY EMERGENCIES OF EARLY LIFE.

BY

LOUIS STARR, M.D.

SEVENTH EDITION.

WITH TWENTY-FIVE ILLUSTRATIONS.

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TO

MY LITTLE PATIENTS,

SOME OF WHOM,

IN THE RAPID PASSING OF TIME, MAY SOON ASSUME
PARENTAL DUTIES,

THIS VOLUME

IS AFFECTIONATELY DEDICATED

PREFACE TO THE SEVENTH EDITION.

In the preparation of this edition of HYGIENE OF THE NURSERY the subject matter has been carefully revised, and amended wherever necessary to keep abreast with the advances and improvements constantly being made in the methods of managing infants and children. Special attention has been given to the chapter on "Food," and numerous additions have been made to the "Dietary" and to the section devoted to "Emergencies." These changes and additions the writer believes will materially enhance the working value of the book, and perhaps increase its claim to the favor which has been so flatteringly accorded to it in the past.

The author's thanks are due to Dr. Thompson S. Westcott for his efficient aid in conducting this issue through the press.

LOUIS STARR.

1818 SOUTH RITTENHOUSE SQUARE,
PHILADELPHIA, *June, 1906.*

PREFACE TO THE FIRST EDITION.

Having a firm belief in the proverb that "an ounce of prevention is worth a pound of cure," the author has endeavored, in the succeeding pages, to point out a series of hygienic rules which, if applied to the nursling, can hardly fail to maintain good health, give vigor to the frame and so lessen susceptibility to disease.

He feels, too, that intelligent parents are ever ready to be instructed and willing to coöperate in the great work of preventing disease—the highest aim of scientific medicine.

While every woman of ordinary brain-power can do much to keep her baby well, she should recognize that years of training and experience are necessary to acquire the ability to put the full value upon symptoms, and to handle the tools of medicine. Therefore, little or no reference has been made to drugs or methods of medical treatment.

The first chapter is written with the object of hinting to the mother when, by deviations from the features of health, she may expect the onset of disease and call in professional counsel. The last is

offered, not as a complete guide to the practice of physic, but simply for the sake of giving information upon questions that often arise in the nursery.

The child's doctor, in our day, regulates his patient's diet, clothing, bathing and exercise, and looks into the hygiene of the nursery before he orders medicines, and if the mother has sound ideas upon these subjects she is no mean assistant.

The author's thanks are due to Dr. W. M. POWELL for efficient aid in the preparation of the manuscript and idex, and to Dr. ALLEN J. SMITH for the illustrations.

LOUIS STARR.

PHILADELPHIA, *September, 1888.*

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HYGIENE OF THE NURSERY.

CHAPTER I.

THE FEATURES OF HEALTH.

Every ill child presents certain well-defined alterations in the manner of performance of the various functions of the body. Thus, the pulse and respiration may be altered in character and frequency; the surface temperature may be elevated; the color and condition of the skin may be changed; the appetite may be diminished; weight may be lost, and so on. These alterations from the normal state are termed *symptoms*.

Healthy children, on the other hand, as uniformly show evidences of their well-being, which, for want of a better name, may be called the *features of health*. Of these every mother should have a full knowledge, so that by appreciating variations she may anticipate the complete development of disease, and early summon skilled aid, at the time when it is of most service.

Early life must be divided into two periods, namely, infancy and childhood. Infancy is the

time elapsing between birth and the complete eruption of the milk teeth, an event that transpires about the end of the second year of life. Childhood extends from this age to the development of puberty, or to the age of thirteen or fifteen years. It is important to remember these two divisions, as frequent reference will be made to them in the subsequent pages.

With this brief preparation, the study of the features of health may be entered upon.

1. **The Face.**—The face of a healthy, sleeping child wears an expression of absolute repose. The eyelids are completely closed, the lips very slightly parted, and, though a faint sound of rhythmical breathing may be heard, there is no visible movement of the nostrils. When awake and undisturbed, the healthy infant's face has a look of wondering observation of whatever is going on about it. As age advances, intelligence gradually supplants the wondering gaze, and no one can be unfamiliar with the bright, round, happy face of perfect childhood, so indicative of careless contentment, and so mobile in response to emotions.

Examples of Variations in Disease.—Incomplete closure of the eyelids, rendering the whites of the eyes visible during sleep, is a symptom in all acute and chronic diseases of a severe type; it is also to be observed when rest is rendered unsound by

pain, wherever seated. Twitching of the eyelids, associated with oscillation of the eyeballs or squinting, heralds the visit of convulsions. Widening of the orifices of the nose, with movements of the nostrils to and fro, points to embarrassed breathing from diseases of the lungs or their pleural investment. Contraction of the brows indicates pain in the head; sharpness of the nostrils, pain in the chest; and a drawn upper lip, pain in the abdomen. To make a general rule, it may be stated that the upper third of the face is altered in expression in affections of the brain; the middle third in diseases of the chest, and the lower third in diseases of the organs contained in the abdominal cavity.

2. **The Skin and General Appearance.**—In the new-born infant the color of the skin varies from a deep to a light shade of red. After the first week this redness fades away, leaving the surface yellowish-white. At times this yellow color is so marked that it might be mistaken for jaundice were it not that the whites of the eyes remain perfectly pearly, which is never the case in the disease mentioned. After the second week all discoloration disappears and the skin assumes its typical appearance.

With certain well-known natural variations in complexion the skin of a healthy child is beautifully white and transparent. The cheeks, palms of the hands and soles of the feet have a delicate pink

color, while the general surface is rosy in a warm atmosphere and marbled with faint blue spots or lines in a cold one; this mottling is most marked on the extremities. As age advances the coloring becomes more pronounced, and until the completion of childhood the complexion is much fresher than in adult life.

Other characters of the healthy skin are a velvety smoothness and softness, a scarcely perceptible moisture, and a great degree of elasticity.

If an infant be stripped the large size of the head and trunk, and the relatively short arms and even shorter legs, will strike the observer at once. This disproportion, especially noticeable in the head, is an actual one. For if in a child of one year, for example, the distance from the lower edge of the chin to the top of the head be measured, it will be found to be equal to one-fourth of the entire length of the body. The vertical length of the head, too, falls but little short of that of the trunk, and the latter in turn is nearly as long as the legs.

Again, the abdomen is full and prominent, making the chest look, in comparison, rather contracted and narrow, and the navel is less deeply sunken than in adults.

These features, which will be referred to more minutely in a later section, are most marked in young infants, and undergo gradual alterations as

growth progresses and the child develops into the lithe, active youth or maiden.

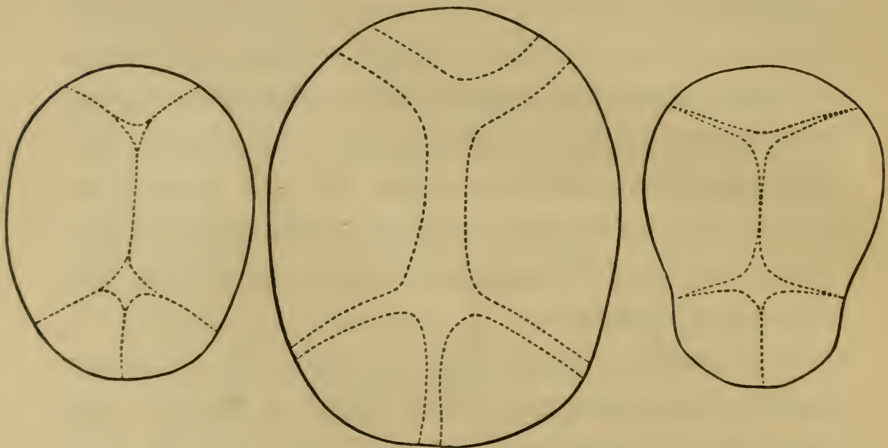
The shape of the head varies greatly between the round, bullet form and the elongated oval one. When it has been subjected to much pressure, instrumental or otherwise, during delivery, it is often so distorted as to shock the expectant mother. Little fear of permanent disfigurement need be entertained, however, as the deformed head usually assumes a natural shape in time. The same is true of less noticeable depressions, prominences and irregularities. But it should be remembered that restoration to symmetry must be left entirely to nature, as any attempt to press or mould the bones of the skull into shape rarely fails to injure the delicate brain beneath.

The anterior fontanelle, or, as it is called by nurses, "the opening of the head," is readily seen and felt in infants under a year old. In the normal state it is level with, or very slightly depressed below, the surrounding bones of the skull, and may be observed to pulsate, or rise and fall, rhythmically. It is soft to the touch and yields readily to pressure.

Examples of Variations in Disease.—Lividity of the eyelids and lips is a sign of imperfect oxidation of the blood, and points to disease of the heart or lungs. A decided yellow color of the

skin and whites of the eyes is seen in jaundice; an earthy tinge of the face, in long-standing disease of the bowels; a waxy pallor in kidney disease, and paleness in any acute or chronic affection attended by exhaustion.

Marked squareness of the head with projection of the forehead, a widely-open fontanelle, and a



a *b* *c*

Fig. 1.—Diagram Showing Shape of Heads.
a, Normal head; *b*, Hydrocephalic head; *c*, Rickety head.

relatively small face indicate rickets. A very large, globular head is characteristic of hydrocephalus or "water on the brain;" bulging of the fontanelle is also a symptom of this disease. In this connection it must be observed, however, that certain children are born with relatively large, globe-shaped heads,

though in every respect healthy. The peculiarity is especially apt to be observed when one of the parents—notably the father—has the same characteristic. In order to indicate disease, the deformity must be marked and combined with a widely open, bulging fontanelle, or with indications of impaired brain activity. Depression of the fontanelle shows general debility and the need of food or stimulants.

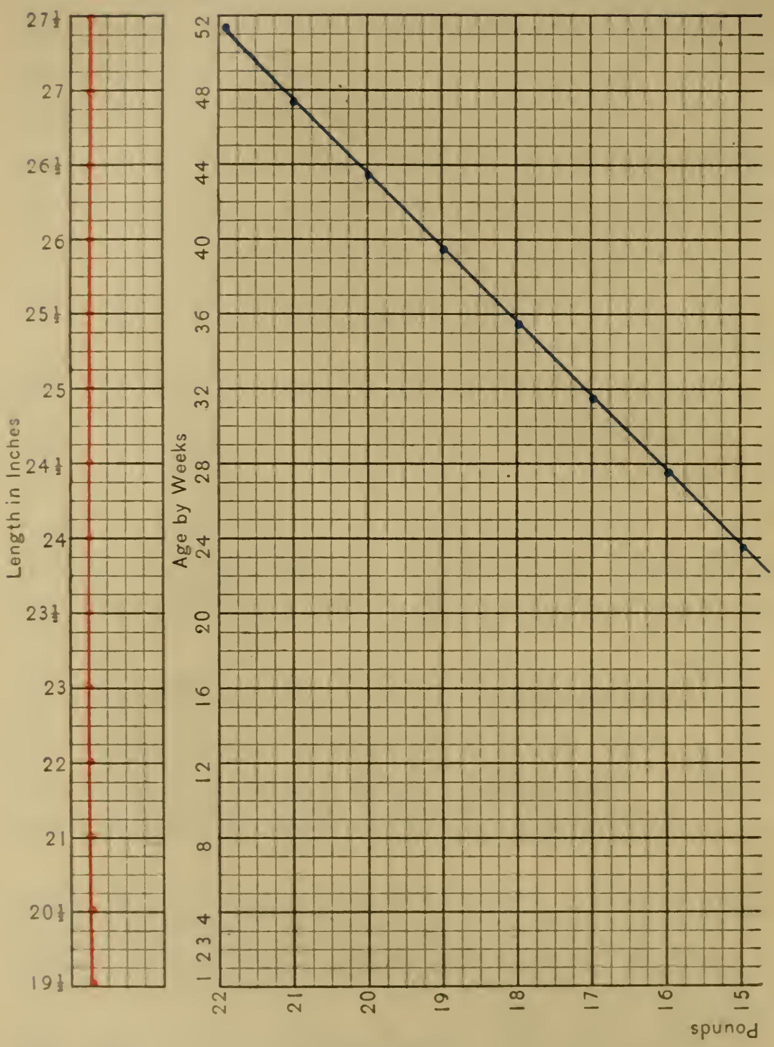
The accompanying diagram (Fig. 1) will aid in explaining this subject.

Great distention of the abdomen is usually due to an accumulation of gas in the intestines, and indicates disease of this portion of the digestive tract; marked depression, on the other hand, is encountered in serious brain affections, in cholera infantum, inflammation of the intestines and dysentery.

3. **Development.**—To be robust the newly born infant must have a certain average length and weight. The length varies between sixteen and twenty-two inches, and the weight between six and eight pounds.

From the first day, growth or increase in length and weight steadily progresses according to certain definitely fixed rules.

Length increases most rapidly during the first week of life; afterward the progress is almost uniform up to the fifth month, and then it becomes less


Length in Inches
27½
27
26½
26
25½
25
24½
24
23½
23
22
21
20½
19½
Age by Weeks
52
48
44
40
36
32
28
24
20
16
12
8
4
1 2 3
Pounds
22
21
20
19
18
17
16
15

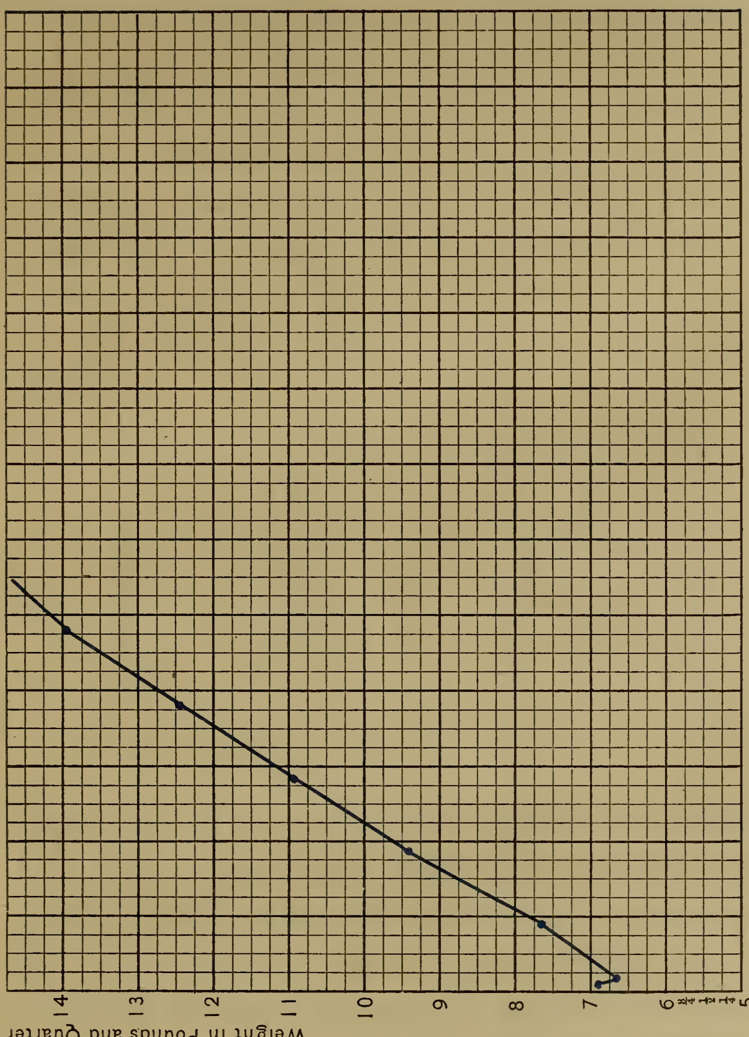


FIG. 2.—CHART FOR RECORDING INFANT'S GAIN IN WEIGHT AND LENGTH.

rapid, though still uniform, until the end of the twelfth month.

These facts may be seen in the following table:—

AGE.	LENGTH.
Birth	19.5 inches.
1 month	20.5 "
2 months	21. "
3 "	22. "
4 "	23. "
5 "	23.5 "
6 "	24. "
7 "	24.5 "
8 "	25. "
9 "	25.5 "
10 "	26. "
11 "	26.5 "
12 "	27. "

During the second year the increase is from three to five inches; in the third from two to three and a half inches; in the fourth from two to three inches, and from this age up to the sixteenth year the average annual gain is from one and two-thirds to two inches.

In the first three days of life there is always a loss of weight, but by the seventh day the babe

should have regained weight and be as heavy as at birth. The period of most rapid gain in this respect is during the first five months of life. The maximum is attained during the second month, when the increase is from four to seven ounces each week. Throughout the next three months the increase amounts to about five ounces per week, and in the remaining months of the first year, from two to five ounces.

The subjoined table shows the average rate of gain:—

AGE.	WEIGHT.
Birth	7 pounds.
1 month	$7\frac{3}{4}$ "
2 months	$9\frac{1}{2}$ "
3 "	11 "
4 "	$12\frac{1}{2}$ "
5 "	14 "
6 "	15 "
7 "	16 "
8 "	17 "
9 "	18 "
10 "	19 "
11 "	20 "
12 "	21 "

Increase in weight and stature are so clearly related to the quality and quantity of food supplied to the infant, and to the processes of digestion, absorption and assimilation, in other words, are such perfect indices of proper nutrition or the reverse, that it is important to keep a record, during the first year at least, of these two features of development. This can be graphically accomplished, and so more readily appreciated, by placing the data upon a chart, such as shown by Fig. 2. Here the average normal weight-gain and increase in length are indicated by the blue and red lines respectively. The figures at the top of the main chart denote the age by weeks, the heavy vertical lines marking periods of *four* weeks, the lighter, periods of *one* week. The figures on the left are numerals of weight, the heavy horizontal lines marking pounds, the lighter, quarter-pounds. The intersection of these sets of lines form squares, one for every weight and age. In making the record, a dot is marked in the square corresponding to the weight and age. At the next observation a second dot is made in the proper square, and so on. These dots are connected by a line, and a comparison of this line with the test blue line shows at once whether or not the special infant's weight-gain is normal. Gain in length is marked in the same way, near the red line, in the upper division of the chart; the

figures, already mentioned as indicating the age in weeks, applying equally to this part of the record, while the numbers at the extreme top of the chart indicate length in inches.

From the first to the tenth year there should be a yearly gain of at least four or five pounds, and after, to the sixteenth year, of about eight pounds in the same period.

Parents frequently overestimate the weight of their children by placing them upon the scales when completely dressed. To be accurate, the weight of the clothing must be subtracted. This may be estimated at about three pounds for a child of three to five years, four pounds for one of eight years, and eight pounds at fifteen years.

Another reliable evidence of the proper progress of development is the increase in the girth of the chest. Taking an infant weighing seven pounds and measuring nineteen and a half inches at birth, this should be a little over thirteen inches. By the fourth month it should be increased to fifteen inches; by the sixth, to sixteen; by the twelfth, to about seventeen; by the fifth year to twenty-one, and by the sixteenth year to thirty.

As already mentioned, the proportions of the different members of the frame in infancy differ materially from those of adolescence.

Primarily the head and secondarily the body are

large when compared with the arms and legs, but in the progress of healthy development this disproportion is gradually lessened until the perfect human figure is attained. This developmental process, however, does not affect all parts of the body equally, as may be seen in the accompanying diagram.* (Fig. 3.)

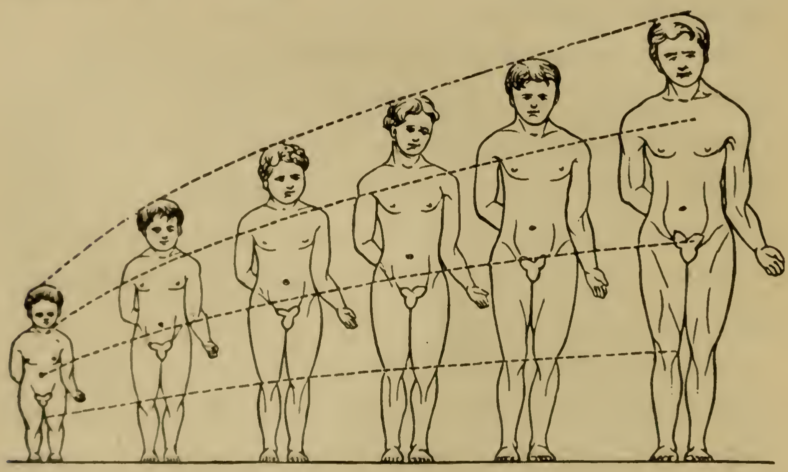


FIG. 3.—DIAGRAM SHOWING RELATIVE STATURE FROM 1 TO 22 YEARS OF AGE.

The description is so well put in the journal from which this figure is taken that I cannot do better than quote it word for word:

"The six figures represent the average relative stature of males of the ages of one, five, nine, thirteen, seventeen, and twenty-two years. It will be noticed that the figures all stand on a level plain.

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* "Babyhood," Vol. II, page 311. Paper by Leroy M. Yale, M.D.

The tops of the heads are connected by a dotted line, and the height of each figure is divided into four equal parts, the points of division being connected with the corresponding ones in each figure. If the rate of growth were uniform the dotted lines connecting the heads would, of course, be straight if a child for every year were included in the rank. But in the earlier years the growth is much more rapid than it is later, and hence the line is a curve, rising quite suddenly at the first, and becoming flatter toward the end of growth. It is to be understood that these are all *averages*, including, but not showing, the extremes of slowness and rapidity of growth as well as fitfulness of growth. The diagram also shows the different development of different parts of the person. The head, for instance, in the child of one year is nearly one-fourth of the whole height; that of the adult is about two-thirteenths, or, to use the phrase of artists, the little child is not much more than four heads high, while the adult of twenty-two is about six and one-half heads high; and even this is a much larger head than the average adult has. Notice that the third dotted line, marking one-half of the total height, crosses the navel in the infant, while in the adult the half height mark is but little above the juncture of the legs and the body, which shows how much larger, proportionately, the body of an

infant is than an adult's. If this same line be followed it will be noticed that it keeps well up in the abdomen until after the age of nine. Between that age and puberty the growth of the lower extremities is usually very rapid, and the well-known 'shooting up' of boys and girls takes place, the whole person growing, but the lower part in particular. Similar changes of location will be noticed by following the quarter-lines, but the changes are not so abrupt."

It may be well to mention here that children will often remain, for a considerable time, almost stationary in height, and then have periods of very rapid growth. The latter is often to be observed in the ninth or tenth year, and again at the approach of puberty. Variations in weight-gain are also often to be observed; these seem to hold a definite relation to the fluctuations in the rapidity of height-increase.

Besides these points, which are the most reliable evidences of the proper progress of development, there are certain features that appeal more directly to the notice of parents, and on this account deserve consideration. The age at which a child sits erect, at which it creeps, walks or talks, are instances of the class of features referred to.

The head can usually be held erect by the end of the third month and the body maintained in the

sitting posture a month later. By the sixth month the infant can sit up with ease, accomplish many movements with the arms, hands and fingers, and enjoy playthings. At the eighth month he may be able to creep; by the ninth or tenth, to drag himself upon his feet with the assistance of his hands and arms and some artificial support; by the eleventh, to walk with assistance; by the fourteenth, to walk alone, and by the eighteenth, to run.

At eight months an infant will imitate sounds and articulate several syllables; at ten, can often speak one or two words, and after twelve months is able to join several words together.

The anterior fontanelle should be completely closed at some period between the fifteenth and twentieth months.

Tears begin to be secreted during the third or fourth month, and saliva, between the fifth and sixth.

After birth both hair and eyes often change color as age advances. When an alteration takes place in the eyes,—which are quite commonly blue or blue-gray in the new-born,—it begins about the sixth or eighth week and may be to either a lighter or darker hue. Changes in the hair begin later, the tendency always being to darken, and the most marked alteration occurring between the seventh and fourteenth years.

Examples of Variations in Disease.—If on being measured and weighed, a child be found to fall short of the normal standard for its age, and if, at the same time, there is a want of plumpness of body, roundness of limb, and firmness of flesh, the existence of some fault in diet or in the digestion and absorption of food must be inferred.

A delay in walking may be due to general feebleness or to paralysis of the muscles of one or both legs, and a limping gait with pain in the knee suggests hip-joint disease.

Closure of the fontanelle is retarded by the disease called rickets, and also by hydrocephalus and constitutional syphilis.

It is well to be cognizant of the fact that girls develop more rapidly than boys, and that the second or later children of the same family, by imitating their elders in the nursery, learn to talk and walk earlier than those who are born first.

4. **Position and Gestures.**—The complete repose depicted on the countenance of a sleeping child when free from illness is shown also by the posture of the body. The head lies easy on the pillow, the trunk rests on the side, slightly inclined backward, the limbs assume various but always most graceful attitudes, and no movement is observable but the gentle rise and fall of the abdomen in respiration. In the waking state, the

child, after early infancy, is rarely still. The movements of the arms, at first awkward, soon become full of purpose as he reaches to handle and examine various objects about him. The legs are idle longer, although these, too, soon begin to move about with method, feeling the ground in preparation, as it were, for creeping and walking.

Examples of Variations in Disease.—Restless sleep, with a desire to be rocked, fondled or "walked" in the nurse's arms, are common symptoms of acute attacks of illness, especially when attended by pain. Children beyond the age of infancy toss about uneasily in bed or demand a change from the bed to the lap, under similar circumstances. Extreme and long-continued drowsiness and quietness, on the other hand, often precede the onset of such specific fevers as scarlatina or measles.

Sleeping with the head thrown back and the mouth open indicates enlarged tonsils or adenoid growths; a tendency to "sleep high," or with the head and shoulders elevated by the pillow, accompanies disease of the heart and lungs, and "sleeping cool," that is, resting only after the bedclothes have been kicked off, is an early symptom of rickets.

Frequent carrying of the hand to the head, ear, or mouth shows headache, earache, or the pain of a coming tooth, as the case may be, while constant

rubbing of the nose is a feature of irritation of the bowels or stomach.

Should the thumbs be drawn into the palms of the hands, and the fingers tightly clasped over them, or if the toes be strongly flexed or extended, a convulsion may be expected.

5. **The Voice.**—Crying is the chief if not the only method that the young infant possesses of making known his displeasure, discomfort or suffering and affords almost the sole means of determining the characters of the voice at this early age. Again, even long after the powers of speech have been developed, the cry continues to be the main channel of complaint.

One rarely hears a healthy child cry, unless a harsh word, a fall or a blow cause a passing storm of grief, anger or pain. Hence, frequent, peevish crying points to some disturbance of the healthy balance.

The sound of the voice, whether in crying or speaking, should have a clear ring, without either muffling, hoarseness or nasal tone. Weeping should accompany crying, after the establishment of tear secretion. Cough, although not a normal vocal sound, is also worthy of attention.

Examples of Variations in Disease.—Incessant, unappeasable crying is usually due to earache or hunger; it frequently, too, is caused by the constant

pricking of a badly-adjusted safety-pin or other mechanical irritant.

If crying occur during an attack of coughing it is an indication of some painful affection of the chest; if just before or after an evacuation of the bowels, of intestinal pain.

When the cry has a nasal tone it should suggest swelling of the lining membrane of the nose, or other obstructing condition. Thickening and indistinctness occur with throat affections. A loud, brazen cry is a precursor of spasmodic croup, and a faint, whispering cry, of true or membranous croup. Hoarseness points to disease of the lining membrane of the larynx, either catarrhal or syphilitic in nature.

Finally, a manifest unwillingness to cry can be seen in pneumonia and pleurisy, when the disease is severe enough to interfere materially with breathing.

Tear-secretion having been established, it is a bad omen if the secretion be arrested during the progress of an illness, but an equally good one if there be no suppression, or if there be a reëstablishment after suppression.

The cough, like the voice, may be brazen in spasmodic croup, hoarse in laryngeal catarrh, and suppressed in true croup. The qualities "tightness" and "looseness" are readily appreciated and

give a good idea of the progress of lung affections, especially bronchitis, the former being an evidence of the beginning, the latter of the favorable termination of an attack.

Cough is always unproductive, that is, unattended by expectoration, in children under seven years of age.

6. Mode of Drinking and Swallowing.—By watching an infant taking the breast or bottle, some information can be obtained of the condition of the mouth and throat, and of the respiratory organs. A healthy child drinks continuously without stopping to breathe, and swallows easily.

Examples of Variations in Disease.—If there be any soreness of the mouth the nipple will be held only for a moment and then dropped with a cry of pain. When the throat is affected in infants, swallowing is performed with a gulp, an expression of pain passes over the face, and no more efforts are made than required to satisfy the cravings of hunger. Older children, under similar circumstances, drink little and refuse solid food.

An infant suffering from the oppressed breathing of pneumonia or severe bronchitis, seizes the nipple with avidity, swallows quickly several times and then pauses for breath. In older children the act of drinking, which should be continuous, is interrupted in the same way.

If the finger be put into the mouth of a healthy baby it will be vigorously sucked for some little time. Diminution of this act of suction during a severe illness is a sign of danger; its reëstablishment a good omen. In conditions of stupor it is noticeably absent.

7. Appetite.—Hunger and appetite must not be regarded as synonymous terms. The former is the craving of all the tissues of the body for nutritive material, or food, and is expressed by a sinking or craving sensation in the stomach. The latter, on the other hand, though it is certainly an attendant of hunger, is simply a sensation of the desire for something with a food-taste, having its seat in the mouth and surrounding parts. Appetite having its post, as it were, at the entrance of the stomach, may be regarded as a gate-keeper to supervise everything presented for entrance and to reject all that may be injurious either to the stomach or the general economy.

Like its analogue the gate-keeper, the trustworthiness of the appetite may be destroyed by overindulgence and bad habits. Under the last head come the constant administration of too much or too little food, the use of overrich food and irregularity in meal hours.

A healthy appetite—that is, one that leads a child to consume with enjoyment the food set before

him—may be encouraged by muscular and mental exercise; by contentment; by regular habits as to the hours of eating; by the use of plain food only, and by varying the food, in a greater or less degree, according to the age. If the quantity of food consumed at the regular meals does not come up to the parent's standard of sufficiency, it does nothing but harm to resort to too dainty feeding and to an encouragement to eat between meals.

There can be no question that a good appetite is a useful as well as a pleasant faculty for a child to possess, for there is no doubt that food eaten with relish is much better digested and therefore more serviceable in nutrition than that which is simply crowded into the stomach.

Examples of Variations in Disease.—Loss of appetite is encountered in febrile attacks and in acute disorders of the stomach. Inordinate appetite, on the contrary, is usually met with when too *strong* food has been administered. Here the increased hunger is due to the fact that the food administered, while it may be very rich in nutritive properties, is ill-adapted to the delicate digestive power of early life, and thus, by not being properly prepared for absorption, places the child in the anomalous position of starving in the midst of plenty. In more advanced children gluttony may depend upon gastric irritation, a condition which often leads older

and presumably wiser heads to over-indulgence at table.

8. Eructation.—Eructation or regurgitation is readily produced and of frequent occurrence in infancy, on account of the vertical position and more cylindrical outline of the stomach at this period of life.

Babies suckled at a freely-secreting breast often erüctate, though they may be in the best possible health. In these cases, the supply of food being large, the infant, as it lies at the breast, is apt to draw more than it needs and more than it can digest, and the stomach, through a wise provision of nature, rids itself of the superabundance by the simple act of regurgitation. In this process, which in reality is an evidence of health, there is no violent muscular effort, as in retching or vomiting, nor any evidence of nausea, and the material ejected is the breast milk alone, either entirely unaltered or slightly curdled.

In older children, expulsion of the contents of the stomach, or vomiting, may also occur after the stomach has been overladen. If the act be followed by relief from a feeling of general distress, headache and pain in the upper abdomen, it is not to be regarded as a symptom of disease.

Examples of Variations in Disease.—Vomiting, with its violent muscular effort and the attendance

of the train of symptoms embraced under the term nausea—namely, paleness, languor, faintness and an increased secretion of saliva—occurs in many different conditions. It may indicate disease of the stomach, of the intestines, of the lungs or their pleural investment, and of the brain; or it may be an initial symptom of one of the eruptive fevers, scarlet fever or measles, for example, which condition, when existent, can only be determined by closely observing the special case.

The character of the material ejected from the stomach is more definite. Thus, the expulsion of mucus is a symptom of gastric catarrh. The regurgitation of mouthfuls of curdled milk, partly digested food and liquid, so sour that it causes a grimace to pass over the face, is an indication of dyspepsia with fermentation and the formation of an irritant acid. The appearance of lumbricoid worms in the vomit, a not very infrequent occurrence, shows, without dispute, the existence of these parasites in the digestive canal.

9. **The Fæcal Evacuations.**—The daily number of evacuations of the bowels natural for a child varies greatly with its age. For the first six weeks there should be three or four movements every twenty-four hours. After this time, up to the end of the second year, two movements a day is the normal average. Subsequently, the frequency is

the same as in adults—once per diem—though two or three movements in the same interval may occur, especially after overfeeding or after eating food difficult of digestion, and must be looked upon as conservative rather than as the evidence of ill health.

During the first period the passages have the consistence of thick soup, are yellowish-white or orange-yellow in color, with sometimes a tinge of green; have a faint fæcal, slightly sour odor, and are acid in reaction. In the second, they are mushy or imperfectly *formed*, of uniform consistence throughout, brownish-yellow in color, and have a more fæcal odor. The last two characters become more marked as additions are made to the diet. After the completion of the first dentition the motions have the same appearance as in adult life; they are *formed*, are brownish in color, and have a decidedly fæcal odor.

Examples of Variations in Disease.—Many alterations occur in disease. The frequency of the movements may be increased, constituting diarrhœa, or lessened, constituting constipation. In the former condition the consistency is diminished, in the latter, increased. Instead of being uniform throughout, the movement may be mixed, partly liquid, partly solid, indicating imperfect digestion, and curds of milk or pieces of undigested solid food may be mingled with the mass. Flaky, yellowish

or yellowish-green evacuations, containing whitish, cheesy lumps, are also met with in cases of indigestion. Scanty, lumpy evacuations, dark brown or even black in color, and mixed with mucus, are characteristic of intestinal catarrh. Doughy, grayish, or clay-colored motions show an inactive liver. An intermixture of blood, altered blood clots, and shreds of mucous membrane, indicate ulceration of the intestinal lining, such as occurs in intestinal inflammation, typhoid fever, dysentery and tuberculous disease. Watery, almost odorless passages occur in the latter stages of summer complaint; most offensive, carrion-like motions, in both catarrhal and tuberculous ulceration of the intestines, and sour-smelling evacuations in the diarrhœa of sucklings. The discovery of worms in the movements is the only certain evidence of the existence of intestinal parasites.

This mere outline of the changes that may take place will serve to show how much may be learned from the evacuations, and the importance of preserving them for the physician's inspection.

10. **The Urine.**—It is impossible to make a definite statement as to the number of times the urine is voided by a healthy infant in each twenty-four hours. In any given case the frequency will differ very much from day to day, depending upon the temperature of the surrounding air and the

amount of moisture that it contains. Sometimes it will be necessary to change the napkin every hour during the day and three or four times at night. Again, it may remain dry for six, eight, or even ten hours. Neither condition indicates disease. If, however, the urine is not passed for twelve hours, a careful examination should be made.

Between these two extremes there is a wide range of variation.

As the child grows older the frequency diminishes, and at the age of three years the number of voidings will be reduced to six or eight during the waking hours, and perhaps one at night. When the desire does arise during sleep, the child, if in a normal state, wakes up and demands the chamber, and never passes urine unconsciously. Wetting the bed, therefore, or the involuntary passage of the urine during sleep, is indicative of an abnormal condition and requires investigation. The quantity of urine voided at different ages may be stated as follows, the figures being approximate only:

From Birth to 2d year.......	8–12	fluid	ounces.
" 2d to 5th year.........	15–25	"	"
" 5th to 10th year.......	25–35	"	"
" 10th to 15th year......	35–40	"	"

From a few observations, I am led to believe that the quantity of urine voided by healthy children

from the fourth to the seventh years is often not as large as supposed, eighteen to twenty ounces being the average in several cases in which I have made measurements.

The urine of an infant, while it wets, should not *stain* the napkin.

Examples of Variations in Disease.—In certain cases of bad digestion the urine becomes very concentrated and high-colored, and gives a light yellow tinge to the napkin. When the stain is decidedly yellow, jaundice is indicated, and other symptoms of this condition should be looked for.

In older children a high-colored urine, and one which deposits a whitish or pinkish sediment on standing, is symptomatic of acute digestive disorder, either catarrhal in its nature, or secondary to some acute febrile affection. A smoky, blackish hue, looking as if there had been an admixture of soot, is characteristic of the acute kidney disease that often follows in the wake of scarlet fever. In this state, too, there is a great diminution in the amount passed. The deposition of a "brick-dust" sediment in the napkin, or upon the bottom of the chamber after the urine has been standing for a time, indicates an excessive formation of uric acid.

Painful urination points to inflammation of the bladder or urethra, a narrow orifice, a highly acid condition of the excretion, or stone in the bladder.

11. **The Respiration.**—In adults there are two well-marked types of respiration, viz., the *abdominal* and the *superior costal.* The abdominal—met with in perfection in adult males—is the type in which the movements of inspiration and expiration are performed by the muscles of the abdomen and lower third of the chest. In superior costal respiration, on the other hand, the movements are most marked in the upper third of the chest. This form is best developed in healthy adult females.

In children the respiration is chiefly *abdominal* in type, irrespective of sex, and it is not until just before the age of puberty that the movements in the female change, becoming *superior costal.* Consequently, in estimating the number of movements per minute it is best to place the fingers lightly on the upper abdomen. The count should always be made by the watch, the most convenient time for the observation being while the child sleeps.

Soon after birth the number of movements per minute is 44, between the ages of two months and two years, 35, and between two and twelve years, 23. During sleep the frequency is reduced about twenty per cent.

Children under two years, while awake, breathe unevenly and irregularly; there are frequent pauses followed by hurry and precipitancy, and some of the movements are shallow, others deep. In sleep

there is greater regularity. After the second year the movements become steady and even, like those of adults. All children, however, but particularly the very young, are subject to a great increase in the rapidity of respiration under the excitement of muscular movement and mental emotion.

Perfectly healthy children breathe through the nose, and so softly that it is necessary to place the ear close to the face to hear the breezy sound of the ingoing and outgoing air.

Examples of Variations in Disease.—Accelerated breathing occurs during the course of diseases attended by severe fever. Acute affections of the lungs are especially characterized by this alteration, and the more the breathing area is lessened the greater is the increase. Thus, in pneumonia, 60, 80 or 100 movements a minute are not at all unusual. To speak broadly, rapid breathing may be caused by an elevation in the body temperature, by an interference with the blood aeration, and by thoracic or abdominal pain.

Diminished frequency—the movements being reduced to 16, 12, or even 8 in the minute—is encountered in certain brain affections,—namely, in chronic hydrocephalus, and the later stages of tuberculous meningitis. In such cases the rhythm may be greatly altered,—a *tidal* form being assumed, in which the breathing ebbs and flows, beginning

with an act which is scarcely perceptible or audible, gradually growing deeper until a full, noisy respiration is made, and then slowly subsiding into a period of absolute quiet, variable in its duration. This is termed Cheyne-Stokes respiration.

A dry, hissing sound, or a moist sound of snuffling, indicates partial obstruction of the nasal passages; oral respiration shows their complete occlusion.

Yawning, one of the modifications of the respiratory act, if it recur frequently, denotes great failure of the vital powers and is an unfavorable prognostic element.

12. **The Pulse.**—To obtain any reliable data from the pulse it must be felt during perfect quiet. During sleep is the best time, but if the child cannot be caught in this condition, advantage may be taken of its placidity while feeding or amused by a toy. With very young infants it is sometimes impossible to feel the beat of the artery at the wrist, and it is necessary to ascertain the frequency of the pulse by listening to the heart. After the second month feeling the pulse at the wrist in the ordinary way is not difficult.

The child's pulse differs from the adult's in being much more frequent, more irregular, and more irritable.

The frequency, or the number of beats per

minute, varies with the age. The following is the average rate:—

From	birth to 2d month, ...	160 to 130
"	2d to 6th month, ...	130 to 120
"	6th to 12th month, ...	120 to 110
"	1st to 3d year, ...	110 to 100
"	3d to 5th year, ...	100 to 90
"	5th to 10th year, ...	90 to 80
"	10th to 12th year, ...	80 to 70

These figures represent the pulse in a waking, but passive state. During sleep the frequency is less. Thus, between the second and ninth years there are about sixteen beats less per minute while asleep than when awake; between the ninth and twelfth years, eight less; and between the twelfth and fifteenth years, only two less. Below the age of two years the disparity is even greater.

The irregularity of the pulse in childhood is confined to an alteration of the rhythm, in other words, of the intervals at which the beats succeed each other and the relative strength and volume of each beat. It is most marked in infants and is greatest during sleep, when the pulse is slowest.

The feature of irritability, that is, the facility with which the frequency is increased by muscular activity and mental excitement, is greater in proportion to the youth of the child. A rise of 20, 30, or even 40 beats a minute is not uncommon in

early infancy, under the excitement of the slightest effort or disturbance.

Examples of Variations in Disease.—On account of the wide variations in health, little meaning need be attached to alterations of the rhythm and frequency while unassociated with other abnormal features. When so associated they become important in determining the existence of disease.

Increased frequency is a constant attendant of the febrile state. The extent of the increase corresponds with the degree of elevation of temperature, though the pulse curve always runs higher than the temperature curve. As a rule, the more frequent the pulse the higher the fever. In estimating the risk of the increase, however, the law of the fever in question must be taken into consideration. For example, in scarlet fever a pulse of 160 is usual and not indicative of special gravity. In measles, the same degree of acceleration would be abnormal and show great danger.

Jaundice and inflammation of the kidneys are accompanied by a diminution of the pulse rate.

Irregularity is met with in diseases of the brain and heart, and sometimes in nervous and blood-impoverished children.

13. The Temperature.—By placing the hand upon the surface of the body we can readily detect marked variations in the temperature; thus the

nose and extremities feel cold in diseases associated with depression of the vital forces, and the

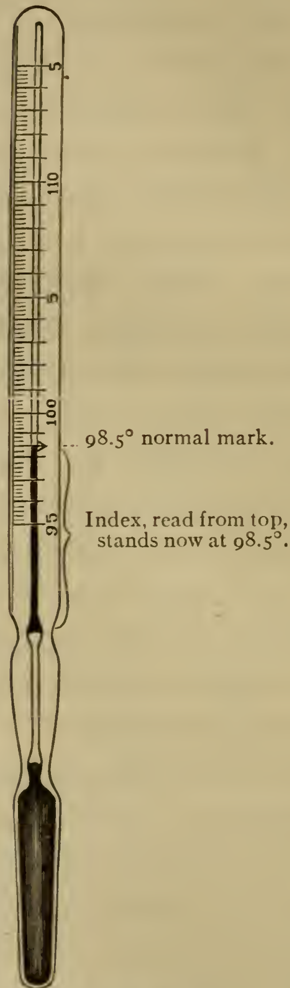

FIG. 4.—CLINICAL THERMOMETER.

palms of the hands and back of the head feel hot

in those attended by fever. But the only possible means of detecting slight variations or of obtaining reliable information concerning normal or abnormal body-heat is by the employment of an accurate thermometer. Clinical thermometers, as these instruments are called, are made entirely of glass, and are usually furnished in the shape seen in Fig. 4.

This instrument is graduated according to the Fahrenheit scale and provided with a self-registering index, which is simply a short column of mercury separated from that in the bulb of the thermometer.

Temperature is usually taken in the rectum of the infant or young child, and in the mouth of a child old enough to understand the purpose of the procedure, and to obey directions to keep the lips closed, the tongue over the bulb of the instrument, and to avoid breaking the glass by the forcible closing of the teeth.

Supposing the rectum be chosen as the place of observation, it is first necessary to be sure that this portion of the gut is free from fæces. The upper end of the stem of the thermometer is then held between the thumb and finger, and the index, by a few vigorous shaking movements, is forced down so far that its upper extremity will be well below the normal mark, to 95° for instance; next, the bulb is covered with sweet oil or vaseline and gently in-

serted through the anus into the rectum for a sufficient distance to conceal completely the mercury. Here it is allowed to remain, according to the sensitiveness of the instrument, from one-half to two or even five minutes by the watch, and on being removed the degree of temperature is read from the *top* of the index. The position of the patient in the meanwhile is upon the back, on the nurse's lap, with the legs elevated and controlled by her left hand, the right hand being used in steadying the thermometer.

When taking the temperature in the mouth direct the child to lie down on his back and instruct him not to bite upon the delicate glass. Then, having seen that the instrument is thoroughly clean and that the top of the index is below the normal point, insert the bulb, crosswise, beneath the tongue. The teeth must be lightly closed so as to hold it in position, and the lips closely shut about its stem. For the time necessary to complete the observation breathing must be performed entirely through the nose.

Temperature is also taken in the arm-pit and groin, but the observation in these positions is inaccurate and unreliable.

One more fact is important, namely, that a simultaneous observation in the different positions mentioned will not furnish identical results; the rectal

and oral temperature being, normally, at least 1° higher than that of the arm-pit, and 1.5° higher than that of the groin in the same individual.

When properly used the thermometer is of great value in the nursery. At the same time, under opposite conditions, it may be the source of much unnecessary alarm to overanxious parents. To prevent the latter misfortune, all who intend to use the instrument should be familiar with the healthy range of temperature and some of the characteristic variations in disease.

During the first week of healthy life the temperature fluctuates considerably. After this the puerile norm—98.5° to 99° F.—is established, but until the fourth or fifth month it is greatly influenced by physiological causes of variation, the fluctuations ranging between .9° and 3.6°. By the fifth month regular morning and evening oscillations begin to be noticeable, and certain definite laws are followed. Thus there is a fall in the evening of 1° or 2°. The greatest fall occurs between 7 and 9 P. M., and the minimum is reached at, or before, 2 A. M. After 2 A. M. there is a gradual rise, the maximum being reached between 8 and 10 A. M. Throughout the day the oscillation is trifling. These variations are independent of eating and sleeping.

It may be taken for granted, therefore, that a temperature between 98° and 99° in the morning

and 97.5° and 98.5° in the evening is the range to be expected in a healthy child beyond the age of five months.

Examples of Variations in Disease.—In disease there may be either a rise above or a fall below the normal standard.

Fever is always associated with an elevation. Rapid and transient rises attend slight catarrhs and passing indigestions. Prolonged rises indicate inflammatory and essential fevers, for example, typhoid, scarlet fever and measles.

The *degree* of elevation marks the type of the fever. This is moderate when the mercury stands at 102°, severe at 104° or 105°, and very grave above 107°. The *duration* of the elevation and the peculiar *range* of the oscillations (for there are oscillations in disease as well as in health) determine the nature of the fever. The febrile oscillations differ from the healthy, in that the lowest marking is noticed in the morning, the highest in the evening.

Variations in the typical range of any given fever are important prognostic omens: a sudden fall of the temperature, together with improvement in the general symptoms, indicates the beginning of convalescence; a similar fall, with an increase of the general symptoms, is a precursor of death. When the morning temperature is equal to that of the preceding evening, there is great danger; if

higher, greater danger still. Marked remission in continued fevers is generally a forerunner of convalescence.

Abnormal depression of temperature is occasioned by hemorrhage and by the loss of fluids in cholera infantum or entero-colitis. It is also met with in anæmia, in wasting from insufficient nourishment, in diseases of the heart and lungs attended by imperfect oxidation of the blood, and it constantly attends collapse and the death agony. A maintained temperature of 97° is dangerous in children, and for every degree of reduction below this point the risk for life is more than proportionately increased.

14. **The Mouth and Throat.**—In infants, gentle pressure of the fingers upon the chin is sufficient to cause wide opening of the mouth. An older child will frequently open the mouth when requested, but if he refuses, the finger, or, far better, the handle of a spoon, or some other smooth, flat instrument, may be inserted in the mouth, and downward pressure made upon the tongue, when the jaws will be widely separated. In some cases, when the child is old enough to do as he is bid, the fauces can be seen by directing the mouth to be opened wide and the tongue to be alternately protruded and retracted, or a prolonged sound of "*Ah*" to be made. With the refractory, and always with infants, the tongue

has to be held down by a spoon-handle or tongue-depressor. If there be resistance, the patient must be taken on the lap of the nurse, who holds his back against her breast, directs his face toward a bright light, and controls the movements of his hands and feet.

The healthy oral mucous membrane has a deep pink color, and is smooth, moist and warm to the touch. The color is deeper on the lips and cheeks, lighter on the gums. The latter, up to the sixth month, as a rule, have a moderately sharp edge. Subsequently, the edge begins to broaden and soften, and the color of the investing mucous membrane deepens to a vivid red, and becomes hot, as the teeth begin to force their way through.

The tongue should be freely movable. It is pink in color, and the dorsum or upper surface, marked in the centre by a slight longitudinal depression, has a velvety appearance, and is soft, moist and warm to the finger. The velvety nap is due to the numberless hair-like processes of the filiform papillæ. There are also scattered over the surface, but most clearly at the tip, a number of eminences, the size of a small pin's head, circular in outline, and deeper pink than the general surface—the fungiform papillæ. While far back, defining the papillary layer, are the circumvallate papillæ, numbering about twelve, and arranged in a V-shaped row.

These have the form of an inverted cone, surrounded by an angular elevation.

The hard palate, or roof of the mouth, is roughened anteriorly by transverse ridges. The soft palate—its continuation—is smooth, and its mucous membrane is paler than that of the rest of the mouth. The fauces, or walls of the throat, on the contrary, are redder. In the triangular recess between the half arches of the palate the tonsils can always be seen. They should be about the size and shape of almond kernels, and they present a number of circular openings, the orifices of pouches, into which the follicles open. The uvula—or, in popular language, the palate—is short and tongue-shaped. The posterior wall of the throat should be red, smooth and moist.

Examples of Variations in Disease.—Fever makes the mouth hot and dry, and causes the tongue to be frosted or coated. Affections of the stomach and bowels are usually attended by coating of the tongue. Inflammation of the mouth itself reddens the lining membrane, makes it hot and tender to the touch, increases its moisture, alters the surface of the tongue and leads to the formation of aphthæ and to ulceration.

15. **Dentition.**—Normally, the first or "milk teeth," twenty in number, are cut in groups, each effort being succeeded by a pause or period of rest.

The diagram and table following show the grouping, the date of eruption, and the duration of the pauses, the numbers, 1 to 5, indicating the groups to which the individual teeth belong and their order

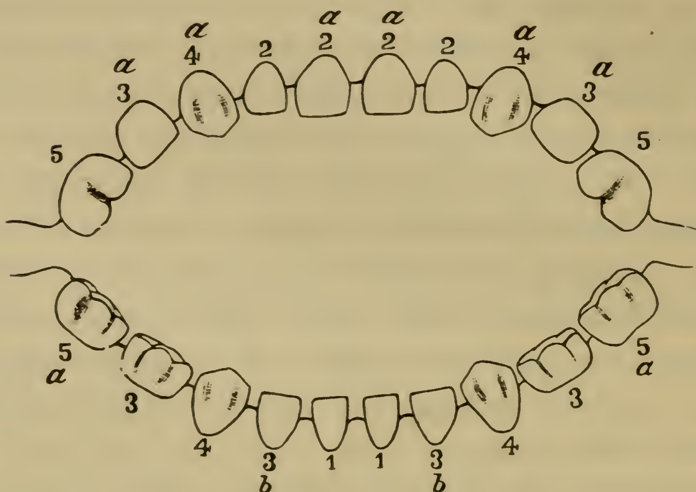

FIG. 5.—DIAGRAM SHOWING ERUPTION OF MILK TEETH.

1 1, Between the 4th and 7th months. Pause of 3 to 9 weeks. 2 2 2 2, Between the 8th and 10th months. Pause of 6 to 12 weeks. 3 3 3 3 3 3, Between the 12th and 15th months. Pause until the 18th month. 4 4 4 4, Between the 18th and 24th months. Pause of 2 to 3 months. 5 5 5 5, Between the 20th and 30th months.

of appearance, and the letters *a* and *b* the precedence of eruption in the different groups (Fig. 5).

The pauses are, to say the least, most helpful, giving the infant's system an opportunity to rest after each effort, to recover from any coincident illness, and to prepare for the next strain.

The dates here given show the time within which the different teeth naturally may be expected. In regard to the period given for the eruption of the lower central incisors, I would state that the fourth month, although an early is not a very rare time for their appearance. For example, I have seen during one winter five cases in which these teeth pierced the gum at this age.

Often the teeth appear without the production of any symptoms. Sometimes the edges of the gums lose their sharpness and become swollen, rounded, and reddened as the teeth approach the surface. At the same time the saliva is increased in quantity, and the mouth is unnaturally warm and the seat of abnormal sensations, evidenced by the tendency to bite upon any object that comes to hand,—in other words, there is a condition of mild catarrhal stomatitis. The consequent discomfort is not sufficient to interfere with the child's appetite, good humor, or sleep, and when, after a few days, the margin of the tooth is free, all the local symptoms vanish.

Examples of Variations.—Abnormal dentition is manifested by departures from the laws of development already stated. The standard rules may be departed from in three ways:—

1. The appearance of the teeth may be premature. Children may be born with one or more of their

teeth already cut; these are usually imperfect, and soon fall out, to be replaced, at the proper age, by well-formed milk teeth. Sometimes, however, they remain permanently, as in a case that came under my own observation. Natal teeth are always incisors. Instances of the lower central incisors being cut in the third month are not uncommon. Girls are more apt than boys to cut their teeth early, and, as an early dentition is likely to be an easy one, the occurrence is to be looked upon as fortunate.

2. Dentition may be delayed. This deviation is more frequently seen and of more consequence than the first. Bottle-fed babies, as a class, are more tardy in cutting their teeth than those reared at the breast. With such, though healthy in every respect, a delay of one or two months is a common and not at all serious event. On the contrary, whatever the method of feeding, if no teeth have appeared by the end of a year, it may be assumed that the child's general nutrition is faulty, or that rachitis is present. Delay does not necessarily imply difficulty in cutting the teeth, although the two conditions are often associated.

3. The teeth may appear out of their regular order. Bottle-fed infants are most likely to show this irregularity, which is of some importance as an indication of general feebleness. In other instances,

however, it is merely a family peculiarity, and, as such, bears no special significance.

The order of eruption of the permanent teeth is as follows:—

The two central incisors of lower jaw, from	6th to 8th	year.
" " " " " upper " "	7th to 8th	"
" four lateral " .... "	8th to 9th	"
" " first bicuspids, ... "	9th to 10th	"
" " canines, ... "	10th to 11th	"
" " second bicuspids,......... "	12th to 13th	"

These replace the temporary teeth; those which are developed *de novo* appear thus:—

The four first molars, from 5th to 7th year.
" " second molars, from 12th to 13th year.
" " third molars, from 17th to 21st year.

There are, therefore, twelve more permanent teeth, making thirty-two in all, sixteen in each jaw.

The diagram, Fig. 6, will aid in explaining the process.

As these teeth approach the surface, absorption begins in the alveoli and at the roots of the deciduous teeth, and this continues until the latter are loosened and readily extracted, or if this be not done, until little is left but their crowns.

When the first and second molars approach the surface, the gums, just as in primary dentition, may become red, swollen, rounded, and tender.

The salivary secretion is increased, the mouth is hot, the patient complains of aching in the gum, and, on account of tenderness, refuses food requiring mastication. With the other sets there is a gradual loosening of the superimposed temporary teeth, pain on mastication, redness and tumefaction

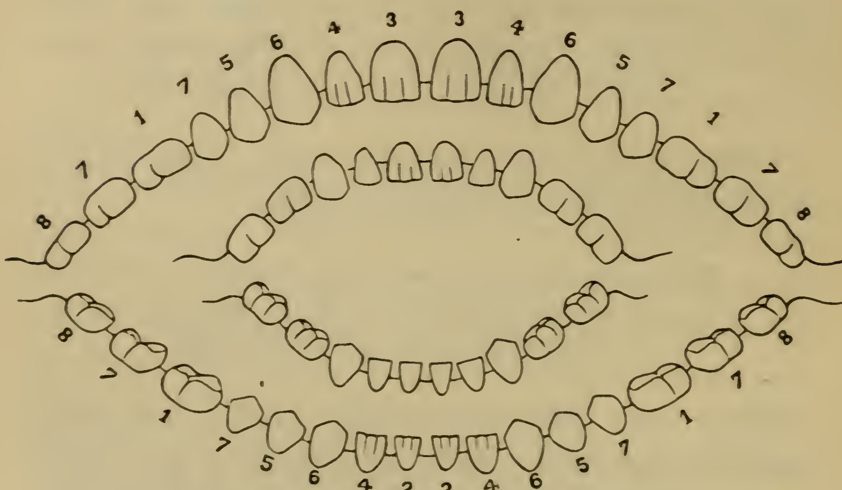

FIG. 6.—DIAGRAM SHOWING RELATION BETWEEN PERMANENT AND TEMPORARY TEETH.

The figures 1, 2, 3, etc., indicate the groups of teeth and the order of their appearance.

of the gum, and augmented flow of saliva. As there is no impairment of the general health, these trifling symptoms must be regarded merely as manifestations of the progress of a physiological process.

In concluding this subject it is important to em-

phasize the fact that many diseases occurring in infancy were formerly attributed to dentition, but as the affections of early life have been more carefully studied and better understood, one disorder after another has been relegated to its proper etiological class, and teething is now regarded as a purely physiological process, unproductive of symptoms. All that can be said is that the interval between the fourth and thirtieth months of an infant's life—the period of primary dentition—is an era of great and widely extended physical progress. The teeth are advancing; the follicular apparatus of the stomach and intestinal canal is undergoing development in preparation for the digestion and absorption of mixed food; the cerebrospinal system is rapidly growing and functionally very active, and the organs and tissues of the whole body are in a state of active change. This period of normal transition must also be one in which there is great susceptibility to abnormal change, or disease, provided there be a causal influence at work. Such an influence usually originates outside of the body, as when there is exposure to cold or to contagion. Second dentition has perhaps a greater but still a merely indirect effect upon the health. During this process the loss of teeth and the local irritation of the gums interfere materially with mastication of the older child's solid food, and digestion and

nutrition being consequently impaired, the general health suffers and there is less resistance to the various external causes of disease. The approach of puberty at this time also puts an additional strain on the system.

CHAPTER II.

THE NURSERY.

Every well-regulated house in which there are children should be provided with two nurseries, one for occupation by day, the other by night.

Before entering further into the subject, however, attention must be directed to the fact that the American city-bred child, belonging to the class in which it is possible to provide separate rooms for nurseries, is to a greater or less degree a migratory creature. For when the first warm days of May or early June make the parents bask at open windows, the child is hurried off to a suburban hotel or farm-house or to the sea-coast. Again, as soon as the cold evenings of late September suggest the comfort of an open fire, equal energy is exhibited to get him back to cozy winter quarters. In summer, most of the waking hours are spent in the open air, in winter, the greater proportion indoors; hence the day nursery must be regarded as a winter resort, and as such must possess qualities that would render it uninhabitable by the child in hot weather. The night nursery should have, though to a much less degree, the same qualities. In other words, to put

the whole subject in a nut-shell, the nurseries for winter use should be warm and freely exposed to the sun; for summer use, cool and rather shaded, though always perfectly dry.

Since the child spends so much time in the open air during warm weather, the nurseries will be discussed in this chapter purely from their winter standpoint, and will be described under the following heads:—

Situation.—Any room in the house will not do for a day nursery. Rather, on the contrary, must the best room be selected. It should have a south-west exposure, and be, if possible, so situated in the building as to allow of at least two broad windows, one in the southern end and one in the western side, and these windows must always be strongly barred. Into such a room the sun plays with full force from a few hours after rising until nearly the time of setting. The third floor of a house is a better elevation for the nursery, especially if there be an attic above, than either of the lower floors, partly because such rooms are remote from the ordinary domestic disturbances, but chiefly because they are drier and more readily heated, and being elevated are less cut off from sunlight by surrounding buildings.

The night nursery should, if possible, adjoin and communicate with the day nursery, although this

feature is less important than proximity to the parents' sleeping-room. It should have a good-sized window so placed that it will freely admit sunlight during the day.

When the nurseries connect, the opening of communication must be capable of being completely closed by a well-fitting door or folding doors, so that one room may be thoroughly aired without chilling the other.

Neither apartment ought to communicate with a bath-room having sewer connections; in fact, although it may be an object of complaint from the nurse, the further off such a bath-room is the better for the health of the child.

While it is a matter of difficulty to accomplish in an ordinary city house, it is, nevertheless, a necessary thing to have the nurseries in close proximity to, or even in communication with, the apartment in which the parents sleep; for then the nurse is forced to be morally purer and physically more attentive than if she have a section of the house to herself.

Many mothers prefer to keep their children at night. Under this condition, the bedroom becomes the night nursery, and its situation must be as carefully selected, and its hygiene as particularly guarded, as the regular night nursery. When, too, there are several children in the family, the risk of over-

crowding in such apartments must be recognized and carefully guarded against. The factor of disturbed rest, by the different hours of retirement of children and parents, is also one of importance. On all of these accounts a night nursery, under the control of a competent nurse, is, in my opinion, to be preferred.

Size.—The amount of atmospheric air required by a healthy child to accomplish thorough oxidation of the blood in respiration is about the same as that demanded by adults. Therefore the smallest admissible room for either a day or night nursery for a single child must have a capacity of eight feet cube. For more than one child the rule ordinarily given is, to multiply this figure—eight feet cube—by the number of individuals. This rule works well enough for a family of two or three children, but if the number be greater, the size of apartments required would much exceed any that could be found in ordinary houses. Lack of space, then, must be made up by more perfect methods of ventilation. To put the question in a more practical form, a room nine or ten feet high, twenty feet long and fifteen feet broad will readily accommodate, either for playing or sleeping purposes, two or three children, with one attendant, provided foul air be constantly removed and fresh air supplied by ventilation.

In every room the undermost stratum of air, and the one in which the child must pass the greater part of his time, whether awake or asleep, has a much lower temperature than the middle, and this, again, than the highest, the tendency of the heated air being always to rise to the top. Now, the greater the height of the apartment, the cooler will be the floor and its neighborhood; consequently, a lofty ceiling—namely, one over ten, or, at most, twelve feet—while it makes an imposing show, is far from being desirable for a nursery, where ease of heating and the comfort and health of the occupants are the ends to be attained. On the other hand, a ceiling less than eight feet high will tend to make the room close, stuffy and overwarm, and correspondingly unhealthy.

Lighting.—As already indicated, the only permissible light for a day nursery is that derived from the sun, and the more plentiful this is, and the more directly it enters, the better. The night nursery may be illuminated by electricity, by gas, by an oil lamp, by a candle, or by a night light. Older writers recommend the last three, upon the supposition that gas, while burning, not only consumes a considerable proportion of the oxygen of the air, but gives off certain injurious products of combustion. This may be true to a certain extent, but the disadvantages are greatly discounted by the increase

in convenience and the greater safety, so far as causing fire is concerned.

Gas, or better, electricity, certainly may be used in the late afternoon and evening. During the night hours, should a light be constantly required, the best means of obtaining it is from one of the regular night lights.

A very admirable form of such a light is shown in Fig. 7. This light, called the "Pyramid Night

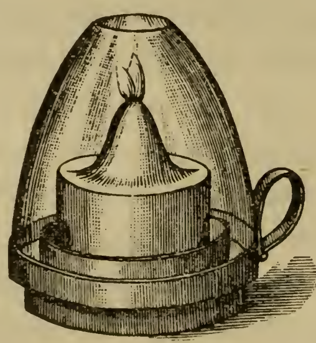

FIG. 7.—NIGHT LIGHT.

Light," consists of a low brass stand having a movable pyramidal glass chimney, and provided with a porcelain cup upon which the candle rests. The candle itself is about one inch and a half in height and breadth, and is so constructed that the combustible material is completely incased in a fireproof plaster-of-Paris cup. Each candle will burn eight or ten hours. These lights are perfectly

safe and may be utilized for the further purpose of keeping food or water warm.

For occasional use at night, nothing can be better or of more ready service than gas or electricity.

The safest way to make a light is to use a safety-match. The taking of a flame from an open fire or the use of ordinary friction matches are dangerous and to be strongly discouraged.

Furnishing.—This heading may be made to include the finish of the floor, walls and ceiling, as well as the necessary articles of furniture and their arrangement.

The floor, which ought to be laid with good yellow pine boards, should have a hard finish. To accomplish this, the crevices between the boards and all the nail holes must first be filled with putty, then, after this has dried, coated with a rapidly-drying, hard shellac varnish, next sandpapered, when the varnish has had time to harden thoroughly, and, finally, finished by a second coat of shellac. This gives a light-colored floor that brightens the room and at the same time is readily cleaned. A dark staining, besides being sombre, always looks soiled. A painted floor is not easily cleaned. Should either of the latter be already in a nursery, their defects may be overcome by a well-laid parquet floor.

A carpet tacked to the floor is not to be recom-

mended; far better is it to have rugs, which can be frequently taken up and well shaken, the housemaid having in the meanwhile free access to the floor itself.

Paint is the best finish for the walls. Individual taste will of course weigh in the selection of the color and amount of decoration, though a light tint, but still one not trying to the eyes, is most desirable. Next to paint, varnished paper is to be preferred. Within the past few years light and soft-tinted fabrics, covered with the representations in figure of familiar nursery legends, have been for sale by paper dealers. Such papers render the nursery attractive to older children, and, to a great extent, take the place of pictures. Paint, however, has the advantage, in that it may be washed and thoroughly disinfected in case of the occurrence of contagious disease.

To return to the subject of pictures, it is best to interdict any that are valuable or expensively framed. A few highly-colored, striking, prints taken from one of the good weekly illustrated papers, and fixed to the painted wall by glue, will give as much pleasure to the childish eyes as the works of the best artists. They can, too, be changed from time to time, and after exposure to contagious germs may, without regret, be removed and burned in the process of cleaning.

The ceiling of the rooms should always be painted with some light color, and be perfectly free from ornamentation.

In the matter of furniture, the day nursery should contain a table at which the older children may take their meals or use in play and study; one or more large chairs and several small ones; a plentiful supply of toys and picture books, and, if there be room enough, a chest of drawers or wardrobe for clothing, and so on. All the furniture must be plain, that it may be more easily kept clean.

The center of the room must be kept clear, to give an opportunity for play. The table, therefore, should be a folding one, that it may be placed out of the way against the wall and take up the least space possible when not in use. Any other heavy article of furniture must also occupy a position against the wall and be fitted with casters, so that it can be readily moved to facilitate cleaning the floor beneath.

The toys may vary in character with the age of the child,—soft, white India-rubber ones for infants, more complicated mechanism for older children; but inexpensive toys are the best, because they can be most frequently changed. The same is true of books. For both, by the way, there should be a special drawer or closet provided, where they can be put out of the way when not required.

A few plants, a bird, or a globe of fish add brightness to the child's room and greatly assist in cultivating good taste and in affording amusement.

The night nursery must contain the beds, the bathing and toilet utensils, several chairs—one being a rocker—a small table, a medicine closet and a chest of drawers or other convenient receptacle for clothing and extra bed covering.

It is essential to have a separate bed for the nurse and one for each child. They should be placed so as to be protected from any chance draught of air, be far enough apart to allow of a free passage between; and the bed of the youngest, or of an ill child, ought to be nearest the one belonging to the nurse.

Old-fashioned pitchers and basins are to be preferred to stationary washstands. The latter, though, are so convenient—especially when supplied with hot- and cold-water faucets—that they may be permitted when the waste pipe is short and runs directly through the wall into a rain spout, instead of communicating with the sewer, and when the nurse can be trusted not to use them as a convenient means of disposing of the ordinary chamber waste

Each child should have his or her own brushes, combs, sponges, soap and towels, and all of them must be kept clean and sweet and have a place of their own.

The medicine closet must contain only such

articles as may be often required, and can be used with safety by a person of average intelligence; for example, olive oil, vaseline, oxide of zinc ointment, talcum powder, soda-mint, sweet spirits of nitre, syrup of ipecacuanha, chalk mixture, etc. Any preparation containing opium—even paregoric—is especially out of place in the nursery medicine chest.

Feeding bottles, implements for the heating and preparation of food and for bathing, also belong to the furniture of the nurseries, but their consideration may be conveniently postponed to later sections.

Heating.—Each room requires an accurate thermometer, so hung that it may record the mean temperature,—not too close to the fireplace or the windows, where it runs the chance of being unduly heated or chilled.

The temperature of the day nursery should range between 68° and 70° F., that of the night nursery from 64° to 68°.

The proper method of heating is by an open fireplace in which either wood or coal is burnt. Either of these fires is superior to a furnace, simply because they serve a double purpose, namely, heating and ventilating. My personal preference is for an old-fashioned hearth, where oak or other quietly burning logs can be used, since a wood fire is more readily lighted and regulated, and is a better venti-

lator than one of coals. Still, in our climate, with its manifold and sudden changes, it is so essential to have a source of heat constantly at hand that it is difficult to banish the furnace register from any living room. Therefore, while recognizing the disadvantage of furnace heat, in that it makes the air too dry, it is well to supply the nurseries with both means of heating, using the open fire in moderate weather and the furnace only in the presence of severe cold.

In my experience, where the nurseries are so situated as to receive direct sunlight through ample windows, there is rarely any need of furnace heat except in the early morning, before the servants have time to make up the wood or coal fire.

Care must be taken to guard every open fireplace with a high fender, one that can neither be knocked down nor climbed over by an active child.

Ventilation.—In addition to furnishing ample space in the nurseries, it is necessary to provide a constant supply of fresh air by ventilation.

By all odds the best ventilator is an open fireplace in which wood is burnt. Such a fire, by creating a draught up the chimney, carries off the impure air, and there are few doors and windows so closely fitting that they prevent the entrance of fresh air to supply the place of that so removed.

Should this not prove sufficient, one of the windows

may be utilized, the upper sash being slightly lowered and the lower sash slightly raised, the openings being sufficient to allow of the entrance and exit of air, but not enough to cause a current or draught in the room.

When the rooms are heated by a furnace or stove, some permanent ventilator must be used. For the egress of foul air an opening may be made in the chimney at a convenient distance from the floor; this may be guarded by an ordinary adjustable register, such as is used to regulate the entrance of heated air from the furnace flue.

The same purpose may also be accomplished by making an opening in the upper part of the door. This should be guarded by a movable sash, or by one of the ventilating appliances to be mentioned later.

To allow of the free entrance of pure air, one of the glass lights may be replaced by a plate of tin having a multitude of minute perforations, or a ventilator made to fit the window may be used.

The best of these are shown in the four following figures.

One apparatus (Fig. 8) consists of two pieces of board, one of which slides upon the other, so that it may be readily adapted to any breadth of window frame. Each portion has a circular opening to which is fitted a tin or sheet-iron pipe, eight

inches long by four inches in diameter, and having a slight upward bend. These pipes are provided with a solid diaphragm (Fig. 9) readily moved by a handle, and intended to regulate the quantity of air

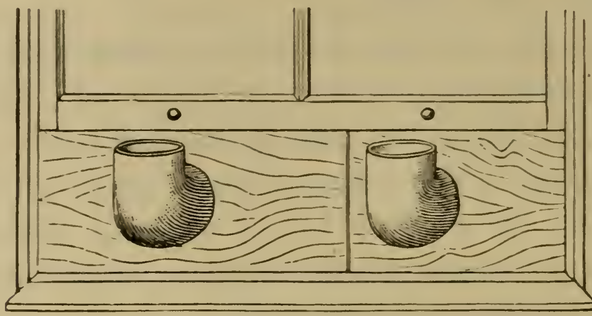

FIG. 8.—WINDOW VENTILATOR.

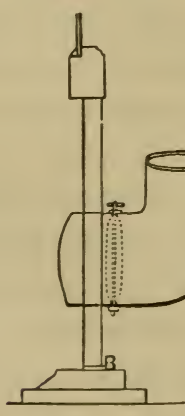

FIG. 9.—WINDOW VENTILATOR IN PROFILE SHOWING DAMPER.

admitted. When in position the pipes, of course, project inward.

The wheel window ventilator (Fig. 10) consists of a movable diaphragm and a revolving wheel, the

whole varying from six to eight inches in diameter. When placed in position, which is readily done by cutting a circular hole in a window pane or in the door, the difference in temperature between the interior and exterior of the room will create a current, and cause the wheel to revolve noiselessly. The revolving wheel, while it prevents a draught, allows of the passage of two currents, that of fresh

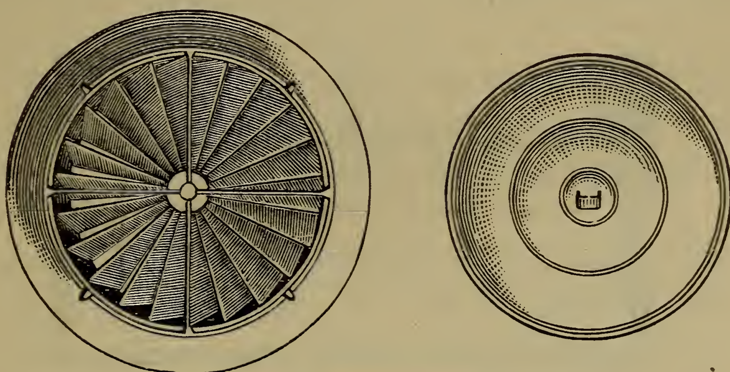

FIG. 10.—WHEEL VENTILATOR.

air inward and foul air outward, and the diaphragm enables one to control the supply of air.

An admirable domestic arrangement for ventilation consists of a board eight or ten inches in height placed across, and close to, the window sill, as in Fig. 11.

This, when the lower sash is raised, as indicated by the dotted lines, allows of a free entrance of air

without a draught, the current being directed upward (as shown by the arrows).

Together with the above careful provision for constant purification of the atmosphere, it is essential to "air" thoroughly both of the nurseries through widely opened windows. With the day nursery this must be done whenever the child leaves it for any length of time, care being taken to close the windows and get the temperature to the proper

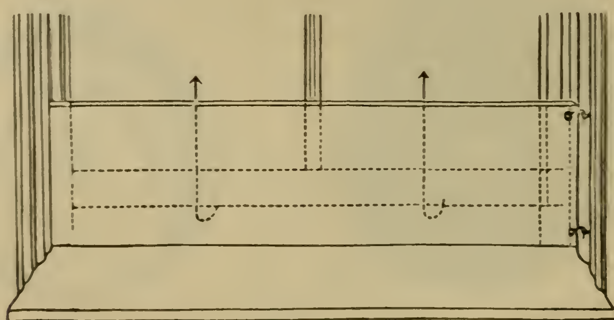

FIG. 11.—BOARD VENTILATOR IN PLACE.

degree before his return. The night nursery should be aired after the children leave it in the morning, and after the midday nap.

The air of the nurseries should, of course, never be unnecessarily contaminated. Cooking or smoking in the rooms is to be specially avoided. In regard to the latter, there is no doubt that children are often made sick by the fumes of tobacco, and

that, of all forms, cigarette smoke is the most injurious.

Cleaning.—It is hardly necessary to say that the nurseries must be kept perfectly clean. Napkins and bed clothing that have been soiled by the discharges from the bladder or bowels must be removed at once from the room, and the practice of hanging diapers wet with urine before the nursery fire to dry should be emphatically discouraged. Equal care must be taken to promptly empty and clean chamber vessels after use.

The furniture, woodwork and window glass, as well as the floors, must be kept clean and free from dust by wiping with a damp cloth at least once a week.

Should there be a stationary washstand in either room, it is most important to thoroughly clean the basin every day, and to disinfect the waste pipe, however short it may be, twice every week. The latter may be done with ammonia, copperas or Platt's chlorides. The process is very simple, and consists in pouring down the pipe a gallon or more of a diluted solution of either of the above articles. Copperas is the cheapest and in my opinion the best; a double handful of it in an ordinary bucketful of water forms an efficient disinfectant and deodorizer.

The substance known as household ammonia may be employed in the strength of two table-

spoonfuls to a gallon of water, and is especially useful where there is a suspicion that the interior of the waste pipe has become coated with a layer of soap.

Platt's chlorides is used in the proportion of one part to four of water, and is very efficient, though more expensive than either of the other materials.

The nurseries must never be cleaned while the children are occupying them.

CHAPTER III.

THE NURSE-MAID.

While the mother is the natural guardian of the physical and moral welfare of her children, the nurse-maid has a considerable influence over both; for the former, however anxious and watchful, has so many other duties, both domestic and social, that she must absent herself at times from the nursery; the latter, on the contrary, lives there. By day, and often, too, at night, she has the care of the children, attending to their apartments, to their persons, food and clothing, participating in their amusements and exercise, and watching over their sleep. The selection of a nurse-maid, therefore, is a matter of much importance.

The celebrated Dr. West, in discussing the nursing of sick children, makes the following statement in regard to a nurse's qualifications: "Indeed, if any of you have entered on your office (hospital nursing) without a feeling of very earnest love to little children—a feeling which makes you long to be with them, to take care of them, to help them—you have made a great mistake in undertaking such duties as you are now engaged in."

Now, though this was addressed to those who were occupied in caring for ill children, it is alike applicable to the nurse whose chief duties are with the healthy.

Love of children, therefore, is essential in a good nurse, but it must be combined with several other traits of character, since love alone will not compensate for such faults as stupidity, inexperience, forgetfulness and lack of judgment.

What, then, are the qualifications to be sought for?

First. The woman should be in the prime of life, between twenty-five and sixty, for example. For if she be under the former age, she is apt to be frivolous and think more of her "afternoon out" and of her male friends than of her charge, while if over the latter, besides being set in her ways and opinionated, she is usually too worn out for efficient day service and too prone to heavy sleeping to be trusted for night duty.

Second. Strength, activity and freedom from disease are necessary. Consumption of the lungs, indicated by a cough, and syphilis, indicated, usually, by an eruption upon the skin, are two diseases to be specially avoided. Besides these two, which are to be shunned because they positively endanger the child's health, there are others that, without doing appreciable harm, render the sufferer's presence

unbearable in the nursery. These chiefly offend through the sense of smell, as in the case of old leg ulcers; too freely perspiring feet; overactive axillary glands; certain forms of chronic catarrh of the nose, throat or nostrils; and of decayed or badly kept teeth.

Third. While beauty is not to be specially sought after, the maid's face should, at least, have a *cheerful* expression. A markedly homely or sinister face is a disadvantage, and still more so is any decided deformity. This reference to personal appearance at first sight, perhaps, seems trivial, but any one who has seen much of children cannot fail to have noticed how a young child will crow and hold out its arms to one who has a placid, comely and smiling face, and turn away from one who wears a sombre and unsympathetic expression. Much is said about the magic of touch in managing young children, but I have observed that their eyes always seek the face and eyes of those about them, and that it is what they see there that guides their instinct for like or dislike.

Fourth.—Children resemble dogs and horses as far as the instinct of knowing those who love them is concerned, and the element of love toward babies is, as already hinted, the most important feature in the disposition of a nurse. A woman having this quality will never be cross or impatient, and, by the

very contagion of her good nature, prevents her charges from being fretful and makes her nursery happy. Besides love, with the patience and consideration it implies, truthfulness is a most important trait of character, not only for the physical welfare of the child, but also that, since children are such imitative creatures, the bad habit of lying may not be formed.

A truthful, loving woman is generally a cheerful one; if not, her place is out of the nursery, for children must be happy to be healthy, and the constant contact with sadness will bring unhappiness to any child.

Gentle speech is also a desideratum. Children will never learn politeness if every sentence they hear in the nursery is spoken in the fewest, shortest words; and "please" and "thank you" are good elements of a nurse's conversation.

Fifth. The nurse-maid should have a sufficiently developed mind to follow out and remember general directions, whether given by the physician or mother, and to do routine work without constant supervision. A certain amount of experience is a good thing, and on this account it is recommendation for a woman to have had a partial hospital training, to have nursed children before, or to have been a mother. On the other hand, one must beware of the self-opinionated maid, who, having

cared for several children, thinks she knows everything, and will be controlled by neither professional nor maternal directions. Such women are as ignorant and inefficient as they are common.

Sixth. Cleanliness is essential in a nurse. A slovenly maid will keep neither her children nor their nurseries clean. Therefore, insist upon the nurse not only washing her face and hands as occasion requires, but upon her bathing her whole body frequently, and upon her wearing fresh, well-aired clothing.

Seventh. So far as habits are concerned, absolute temperance and early rising are the most desirable. Early rising, however, implies an early hour of retiring, and care must be taken to afford ample facilities for so doing.

Eighth. Every nurse-maid should be impressed with the importance of informing the parents of all conditions connected with the health of the child that may demand attention, and of revealing at once any injury that may have been sustained.

CHAPTER IV.

CLOTHING.

In introducing this subject, it may be well to call attention to two important points that are often either unrecognized or overlooked.

First. All children, but particularly infants, have little power to resist the depressing influences of continued cold, and on this account require warm clothing.

Too much cannot be said against the fashion which, for the sake of supposed beauty, demands that children should be dressed in a way to leave their legs and knees bare. Even in the house, and except in extreme tropical weather, this barbarous practice is injurious, as it exposes a considerable part of the body to constant chilling. The physician knows, and the intelligent layman should be readily convinced of, the bad effects of such protracted abstraction of body-heat. The explanation is simple: every child is supplied by nature with a certain definite quantity of nerve force destined to be expended each day in maintaining what physiologists term "the functions of the body," namely, breathing, circulation of the blood, digestion, heat-production,

and so on. Now, if an undue proportion of this nerve force be consumed in producing body-heat, as must be the case when so large a surface is left bare, the other functions will be robbed of force. From this robbery the digestion suffers most. With feeble digestion comes constipation or its opposite, diarrhœa. Again, if the surface be chilled, the blood which should circulate in the skin is driven to the interior of the body, and the vessels of the mucous membrane become surcharged. This surcharging, or congestion, causes the condition known as catarrh, which, affecting the lining membrane of the alimentary tract, causes vomiting and diarrhœa; and, in the case of the lungs, bronchitis.

Mothers who allow their children to have their legs and knees covered with the "hideous" long stockings or drawers, often come to me and complain that Mrs. So-So's children have bare legs, and are even healthier and more robust looking than theirs. Some children are born hardier than others, but no one knows, in the long run, how much better in health, in after life, are those whose vital forces have been husbanded and strengthened in infancy and childhood. I cannot waver in my opinion. I have been too often called to the bedside of these poor little "robust" children whose health, and even life, might have been spared had their clothing been better adapted to their tender years. One great

argument advanced by the advocates of bare knees is that in olden times all children were clad with their arms and neck, as well as knees, bare. No one says how many died by the wayside. What mother would, on a winter's day, care to sit on the floor or walk through the halls with her knees uncovered? The mother who protests the loudest I have always observed to be warmly dressed herself.

Second. Infants and children have soft tissues. This statement applies as well to the bones as to the muscles. Therefore, the clothing should fit loosely, that it may not interfere with the motion of the limbs, with the rise and fall of the chest in respiration, or with the necessary freedom of the muscles of the abdominal wall or intestinal canal, one of which is concerned in respiration, the other in the no less important function of digestion.

Let the clothing, then, be warm and loose.

Thought for the infant's clothing must begin before its birth, with the filling of the "baby's basket." This should contain the following articles:—

A nainsook slip.

A flannel skirt.

A merino shirt, high neck and long sleeves.

A flannel band, twenty-two inches long and six inches wide.

A soft woolen shawl, to be used for a wrap in cold weather.

Worsted socks.
Two linen diapers.
Large and small safety-pins.
One pair blunt-pointed scissors.
Two soft towels.
Castile soap.
Small silk sponge.
Powder box and puff.
Soft hair brush.
Cold cream or vaseline.
Linen bobbin.
Fine old linen, for infant's mouth.

As soon as the child is born and the cutting of the cord frees it from maternal connection, it is the rule to wrap it in a piece of soft flannel and place it in a position of safety until, certain necessary attentions having been rendered to the mother, a convenient time arrives for washing. After this operation, which will be described on a future page, the child is dressed for the first time. Every infant requires knitted worsted shoes, or, as they are popularly called, "socks," a napkin and an abdominal belt or "binder;" the rest of the dress—the body clothing proper—consists usually of three garments, which vary in pattern with individual ideas and tastes.

The socks are made of silk thread or soft worsted yarn fashioned by needles into the shape of shoes,

and of such a size as to fit the foot loosely, while covering the leg two inches or more above the ankle. They are held in position by a loosely tied tape or a narrowed band of stitches—the mechanism of which every knitter will understand—near the top. Stockings are unnecessary, and are rarely used before the clothes are shortened.

The napkin or diaper may be made either of linen or muslin, the former material being preferred, as it is less heating and less liable to cause chafing of the skin when wet. It must be folded in such a way that it may not cause pain by undue pressure upon the back or abdomen.

A soiled napkin can never be safely used a second time, even though the soiling medium be simply urine and the subsequent drying be thorough. In consequence, an abundant supply is essential. The least dampness renders its use dangerous, and while insisting upon the washing of all soiled napkins, it is equally important that they be aired for at least twelve hours before being used again, that they may be surely dry. One must be most careful, too, to insist upon the laundress using only pure soap and avoiding soda in washing, for the constant contact of diapers impregnated with irritating substances is sure to produce troublesome excoriation of the buttocks and neighboring delicate skin.

The binder may be of fine, soft flannel or of knitted wool. In either case it should extend from the brim of the pelvis or hip bones to the lower ribs. I prefer a knitted band made narrower in the centre than at either extremity. Any woman who is apt with her knitting-needles can make one, and the product has the advantages of being readily applied and of keeping its position without the aid of either strings or pins.* When a flannel band is preferred, it should be wide enough to cover the same area, and long enough to go a little more than around the abdomen. It is best fixed in position by two small safety-pins. Such a band is difficult to keep in place, collects more perspiration than the more net-like knitted binder, and the necessary pins may cause inconvenience.

Several bands are required to be on hand at the same time for the sake of proper cleanliness, and, as they should be worn up to the end of the second year, it is necessary to replace them, set by set, as the growth of the child demands.

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* *Formula for Crochetted Baby-band.*—Single zephyr in ridge stitch, that is, half stitch, in which, going back and forth, only the back half of the stitches in the lower row are picked up. Begin on a chain of fifty and crochet forty-eight ridges, hence ninety-six rows. Join by a row of tight stitches or by sewing. Finish off at bottom by a row of plain stitches and at top by a picot-edging (five chains and a tight stitch back into the first).—"Babyhood," Vol. III, p. 33.

The body clothing is usually composed of three separate pieces: a shirt, a petticoat and an outside dress or "slip." The shirt should be long enough to extend from the neck to the lowest part of the trunk and have sleeves reaching to the wrists. It may be made of merino or of soft worsted yarn. In either case it should fit loosely and be fastened at the neck with tape or buttons. The petticoat must be long enough to extend from the waist to six or eight inches below the feet. The proper material for the skirt is light, white flannel. This is gathered at the top into a muslin band, which must be deep enough to reach from the hips to the arm pits, and wide enough to lap over considerably at the back; it is fastened by small safety-pins. The overwidth is to allow for increase in size.

An equally good waist can be made with arm-holes and buttoned in the back.

The dress or slip is made of fine cambric, cut in one piece, opening well at the back that it may be readily slipped on and off.

Another, and I think a preferable outfit, consists, also, of three garments. The first or under garment, made of soft, white flannel, is long enough to extend from the neck to ten inches below the feet —about twenty-five inches in total measurement— with wide arm-holes. All the seams must be smooth, and the hem at the neck turned outward.

The next garment, cut in the same way, but one-half inch larger, and five inches longer, is made of muslin. The slip is also cut Princess, has long sleeves, a longer skirt than either of the other garments, and all are fastened behind by small buttons.

When dressing the infant these three coverings are put together, sleeve fitting to sleeve, and the whole passed over the little one's head, then buttoned behind, and the process is complete.

The advantages of the last method of dressing are—

1. Perfect freedom to the organs contained within the chest, abdomen and pelvis.

2. Suspension of the clothing from the shoulders.

3. Saving of time to the mother and fatigue to the infant in the process of dressing.

4. A uniform covering of the whole body.

So much for the day clothing. At night the dress should consist of the flannel and the outer garment.

In the foregoing, my intention has been to lay special stress upon the advantage of holding the garments in place by tape or buttons rather than by pins, and it should be noticed that a baby may be completely dressed with but one pin in its clothing, namely, that fastening the napkin. This, which is allowed only for the sake of convenience, must be a safety-pin, the ordinary pointed pin being an abomination in the nursery.

It is hardly necessary to say that, for the sake of cleanliness, an abundant supply of body clothing should be at hand; a mother, particularly, must recognize that "cleanliness is next to godliness," and provide accordingly. Let her remember, too, that fresh clothing must be thoroughly aired or dried before it is put upon the infant.

Sometimes, to keep the body clothes dry, a piece of thin rubber cloth is placed over the napkin; this does nothing but harm, for it overheats the parts, and when the diaper is wet with urine, makes a poultice of it, and thus macerates the skin and causes irritating and painful excoriation.

At the age of six months in summer and of eight months in winter, provided, in both cases, the health be good, the clothing may be shortened. This change introduces several important questions, namely, the covering of the legs and knees, and the selection of shoes and stockings.

The shortening process makes no change in the body clothing except that the skirts end a short distance below the knees, at about the point to which an ordinary shoe top comes; this, of course, practically leaves the legs, from the top of a short stocking to the lower edge of the napkin, exposed. As already hinted, it is necessary for the health of the infant to keep this comparatively large surface protected, except, perhaps, during a few extremely

hot days in midsummer. There are two ways of accomplishing this: either by drawers or by stockings long enough to extend from the feet to the napkin, to which they may be attached by safety-pins or ordinary fasteners. The best drawers are those made in two pieces, one for each leg, as shown in Fig. 12.

These, as furnished in the stores, are made of

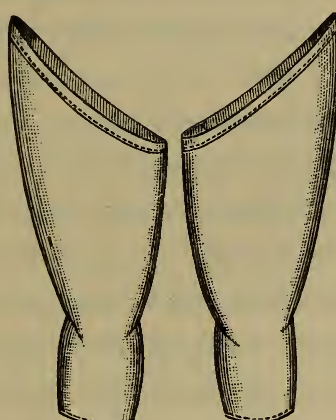


FIG. 12.—DRAWERS.

merino, but any clever woman should be able to cut them out of Canton flannel and make them at home. They must fit the legs moderately closely, and have a buttonhole at the top, so that when passed over the napkin they may be buttoned to the waist of the skirt on its inner side, and so be held up. These drawers are not readily soiled, as they cover the legs only, and the napkin comes be-

tween. They must, of course, be made of material to suit the season,—heavy in winter, light in summer.

When stockings alone are used they must be long enough to come well above the knees, and should be held in position by "supporters" instead of garters, since the latter, being necessarily tight, bind the limbs, and often, by interfering with free circulation, cause cold feet. The supporter must be adjusted to make only the required amount of traction, and this always in a direction parallel with the axis of the body. The stocking foot ought to fit easily, but without wrinkling, and at the same time have a roomy and rounded rather than a conical-shaped toe. For although the silk, woolen, or cotton material of which the stocking is composed may be yielding, it is elastic, and consequently capable of exerting a certain amount of pressure upon the foot; and there is little doubt that the persistent compression made by a short, sharply conical point cramps the toes, crowds them together, and sometimes even forces them to overlap one another.

Colored stockings are often preferred to white, but they are only permissible provided the coloring matter be well fixed in the texture and not of such a nature as to cause irritation of the skin. Every stocking should be turned inside out, carefully examined, and all knots and ends removed, the smallest of which hurt the tender little feet. Were

this matter oftener looked to, many an unexplained tear would be avoided.

As with the drawers, so with the hose; several weights should be provided to correspond with the varying demands of the season for greater or less warmth, and in both cases a sufficient supply must be kept to allow of frequent changing.

The shoes are prominent items of the clothing; their shape, size and manner of fastening, and the make-up of the soles being the important matters for consideration.

An infant's feet are plumper than those of the adult, and all the tissues, but especially the bones, are softer. They may be readily deformed by protracted pressure from badly constructed shoes, despite the assertions of unhandy shoemakers, who say that the feet are shapeless masses of fat, for which any leathern bag having the semblance of a shoe will serve as a covering.

Throwing out the element of fleshiness, the characteristics of the perfectly formed baby and adult foot do not materially differ. In the first place, the inner and outer margins are very different in contour; second, the heel and middle third of the foot is firm and presents little mobility in its component bones, whereas the anterior third, including the toes, is very mobile. The toes again bear much the same relation to the rest of the foot

as the fingers to the hand. This is particularly noticeable in the great toe, which, instead of inclining toward a line passing along the center of the foot, points away from it, in the same manner as the thumb from the hand, although, of course, to a far less degree. An inclination of the great toe toward the mid-line of the foot is undoubtedly often seen in adults, but in them it is a deformity resulting from badly-made shoes, and one that gives a conical contour to the toes, cripples the movements of the great toe, and greatly interferes with the ease of walking, just as a contraction and permanent drawing of the thumb toward the palm of the hand would materially lessen the usefulness of that member.

The normal position of the toes just described will be readily understood from the tracing of the sole of the foot as shown in Fig. 13.

The most striking features of this diagram are, the expanded position of the toes; the width of the anterior part of the foot compared with the heel, and the straight outer and curved inner margins of the foot. The line AB represents the axis of walking, which, while nearly parallel to EF, the inner edge of the foot, forms quite an angle with CD, the center line.

In the normal foot the great toe is directly in the axis of walking, a position in which, of course, it

is of much greater service than if it were inclined inward toward the line CD.

Now, if a line be drawn closely around the margin of the imprint, it will give the exact shape of a perfect shoe sole for the right foot; or taking

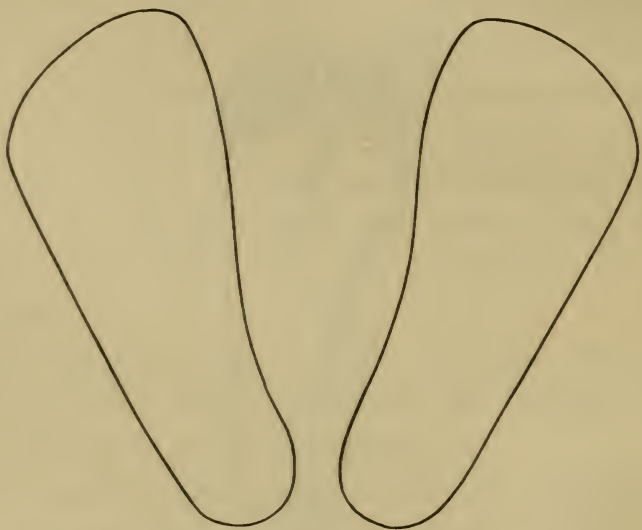
Fig. 13.—Tracing of Normal Foot.

the imprint of both feet, we get the outlines shown in Fig. 14.

On first sight, one would suppose that a shoe with a sole so shaped would look very awkward,

but when made by a skilful shoemaker, it differs very little in appearance from those ordinarily sold in the shop, with the exception that it is broader at the toes.

Another important fact is clearly demonstrated by Fig. 14, namely, the absolute necessity of having the shoes made "right" and "left," and the fallacy of



Left Foot. *Right Foot.*
FIG. 14.—SHAPE OF PROPER SHOE SOLES.

supposing that one or the other shoe may be used on either foot indiscriminately.

Besides having a correct shape, the shoes should be long enough not to cramp the toes and bend them down and backward upon themselves. At the same time it is a mistake to have them too

long, allowing the foot to slide back and forth, as this leads to the formation of either blisters or corns. Let the shoe fit snugly about the heel and instep, and easily at the toes, and all is well. I say easily at the toes, because many an otherwise good shoe is ruined by having the uppers at the points too scanty, so that the toes are forced against the sole and subjected to painful pressure.

The best method of fastening is by a lace, since this admits of making one part of the upper tight and another part loose, according to circumstances.

Elastic fastenings, as in so-called congress shoes, are not good for children; and when buttons are used, the nurse must not necessarily leave them in the position fixed by the shoemaker, but move one or more as the size of the ankle demands.

The thickness of the soles depends upon the age of the child. Before walking is attempted, they may be thin, flexible, and of uniform thickness from heel to toe; afterward they should be made heavier and more resisting, in order to protect the tender feet, and should be decidedly thicker at the heel, that this part of the foot may be elevated. A clear-cut heel, however, as in boots adapted for adults, is not to be recommended in children's shoes before the age of six or eight years.

Sometimes a careful mother may notice that, for a short time after stockings and shoes are put upon

her baby, the feet are cooler than before. Undue pressure about the ankle, with consequent interference with the blood circulation in the feet, is the cause of this, and the remedy is to remove occasionally the coverings, chafe the feet into warmth, and see that the shoe-top is not so tightly laced or buttoned as to constrict the ankle.

So far, all that has been said of the clothing after shortening refers to the day and house garments. It remains now to consider the night dress and the extra wraps to be worn out of doors.

At bedtime, all the clothing worn during the day being removed, the baby is washed, and after the application of a fresh napkin and binder, is ready for the night dress. This consists of a shirt and a special gown. The shirt should always be of flannel, a light gauze in summer and a heavier wool in winter; its pattern may be the same as that worn by day, though its texture ought to be a trifle lighter. The best pattern of a winter nightgown is a long, plain slip, with a drawing string at the bottom, to prevent exposure of the feet and limbs, should the child kick off the bed covering during sleep. It ought to be made of flannel, or the more easily washed Canton flannel. In summer, a loose muslin slip of the same design, but without the drawing string, may be worn. There is even more temptation by night than by day to use a rubber

cloth over the napkin, to protect the body and bed clothing, but never do this.

It is a good plan to provide the child with a flannel garment corresponding to the dressing gown of the adult, and with a pair of bedroom shoes. The latter are composed of soft leather or felt soles and knitted uppers, and are fastened around the ankle by a soft elastic. Both of these will be found useful in the many occasions when the child has to be taken up at night.

When dressing a child for exercise in the open air in cold weather, do not put on the extra outer clothing until immediately before leaving the house, and remove it directly on returning. A long cloak, with or without capes, according to the degree of cold, and a pair of long, warm leggings, constitute the extra covering for the body. Protect the head, in winter, by a close-fitting, thick cap; the hands, by worsted gloves or mittens.

In summer the child may go out of doors in the same dress worn in the house, the head being protected from the direct rays of the sun by a broad-brimmed, light straw hat.

Every mother must decide for herself when her child is to doff the costume of babyhood and assume that of the boy or girl. There are two points that must always be considered, however, namely, the time of dispensing with the napkin and with the

abdominal belt. Abandon the napkin, and substitute ordinary drawers, as soon as the child can be trusted to make known the calls of nature,—a period that varies considerably with the care and skill in training. The binder should always be worn until the completion of the eruption of the milk teeth, or until about the end of the second year.

In clothing the boy or girl, be particular to secure warmth, freedom of movement and cleanliness. The first is accomplished by enveloping the whole body—no matter what the season—in woolen underclothing. This means high-neck and long-sleeve flannel shirts and flannel drawers extending down to the ankles. It is hardly necessary to mention that the thickness of these garments must vary with the seasons, but it is quite worth while insisting upon woolen undergarments, except during the very excessively hot days of midsummer. This provision being made, and the shape of the shoes and stockings* looked into, it matters little what may be the fancy of the mother in regard to outer clothing.

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*It is impossible for either a stocking or shoe to fit accurately unless the toe-nails be kept in good order. In cutting the toe-nails there is, as in every other affair of life, a right and a wrong way. Cut the nail directly across, without rounding the corners. Should the latter be done, the nail is apt to grow into the flesh and give suffering to the child and work to the surgeon.

Freedom of movement refers not only to the limbs, but to the chest and abdomen, which should never be constricted, lest the important organs they contain be crippled in their action. Loose-fitting clothes accomplish this object; but it is to be understood that looseness or ease in fit does not necessarily imply that the dress must be awkward, ill-fitting, and a source of mortification to the wearer. On the contrary, clothes must be easy and yet well cut and stylish.

To be clean, the child must have a plentiful supply of clothing, so that changes may be made as frequently as required. Clean, cheap clothes look much better than soiled finery.

The night dress of a child five or six years old consists, during winter, of a light, high-neck and long-sleeve merino shirt and night drawers of Canton flannel; in summer, of a gauze undershirt, with short sleeves and muslin night drawers.

Cold weather calls for a warm overcoat, hat, mittens, and leggings, or rubber boots in wet or snowy weather, when the child leaves the warmth of the house. Should the cold be so great as to necessitate ear tabs and a neck wrap for protection, a child under six years is better off in the nursery.

As to rainproof clothing—and our climate calls often for both rubber boots and a long mackintosh—it must be remembered that such coverings, while

impervious to moisture from without, are no more pervious to body moisture or, in other words, to perspiration, which secretion they encourage by their warmth. Of course, when perspiration is retained, the underclothing becomes moist, and there is a great risk of surface chilling and consequent catarrh. Therefore, it is a good plan, when waterproof garments have been worn for any length of time, to take off the underclothing as soon as shelter is reached, to rub the surface into a glow with a coarse towel and then redress the child.

Before concluding this chapter, let me advise that the change from winter to spring or summer clothing be not made at any fixed date, under the supposition that it is the time to change, and the weather should be warm, whether it is or not. In our Eastern climate it is unusual to have settled, warm weather until June. May has a certain number of warm days, but they are quickly followed by cooler ones. Consequently the safe plan is to keep on the heavy winter flannels until hot weather surely sets in, changing, in the meanwhile, the outer clothing to suit each day.

CHAPTER V.

EXERCISE AND AMUSEMENTS.

Healthful exercise, especially when taken in the open air and sunshine, invigorates the nerves; secures an active performance of such vital functions as circulation, respiration and digestion; maintains a hearty appetite and regular movement of the bowels, and develops the muscles.

Symmetry of development is essential, and on this account any exercise or play that brings but one or a few sets of muscles into action must be discountenanced. The muscles control the bones, and should one set be comparatively feeble, the bones they move are dragged out of form by stronger opposing sets. Probably the most important groups of muscles to render strong are those of the back which hold the spine in proper position. When these are weak—the greatest weight of the trunk being toward the front—the backbone has a tendency to be drawn forward in such a way that the movements of the chest are crippled, and respiration so interfered with that the blood is imperfectly aerated, nutrition fails, and the child becomes a weak, puny invalid.

Curvature of the spine—the deformity here referred to—may also interfere with other functions; for instance, digestion, elimination of urine and the motion of the legs. Bone deformities are more apt to occur in children than in adults, because, in the former, the bones, not being thoroughly set and hardened, are more readily influenced by irregular muscular action.

Marking, then, the necessity for equal muscular development, the subject of exercise may be taken up in detail.

The first exercise the infant gets will be in the nurse's arms. Shortly (three or four days) after birth the babe may be taken from its crib two or three times a day, and, being placed upon its back on a pillow, carried about the room for ten or fifteen minutes. In the second month, longer walks may be taken, the pillow being discarded and the infant carried in a reclining position in the arms, with the head and body thoroughly supported.

By the fourth month the child will have gained sufficient muscular strength to maintain a sitting posture for a short time, provided the head and shoulders be supported by the nurse's hand, and in this way it may be carried about on the right or left arm—and it is most important not to use one arm constantly—for its daily training.

At the end of the eighth month a healthy child

ceases to require support to the head and back when carried, but not before.

After the infant ceases to be merely a sleeping and eating animal, and begins to show signs of humanity—at about the fourth month, for example—he should be laid upon a soft mattress or sofa several times each day and allowed to do as he pleases.

Under these circumstances he rolls about and kicks his legs, clasps and unclasps his fists, moves his arms, and crows or cries. All these movements serve a purpose; the legs gain strength for future walking; the hands, for grasping; the arms, for carrying, and the vocal organs, for speaking.

A certain class of nurses seems unable to comprehend that a baby is a tender creature, tender not only in age, but in the texture of all its tissues. They support a young infant upright upon their knees and violently jolt it up and down, under the supposition that it gives pleasure, and should the child cry they add to its torment by a peculiar "song." Gentle movement is as pleasant to the child as riding in an easily running carriage on a smooth road is to an adult; knee-jolting is as unpleasant and harmful as a journey over the worst corduroy road. The so-called singing must cause only pain.

The question of outdoor exercise arises soon after

birth. Daily airings are requisite for perfect health as soon as the child has arrived at the proper age, and providing always that the weather be favorable. The fifth month is the proper age for children born in the early fall and winter, and the second month, for those born in summer. In cool weather they should be taken out in a baby carriage or in the nurse's arms, for an hour in the morning and half an hour in the afternoon, while the sun is shining. In summer, they may pass the greater part of their waking hours in the open air. In damp and rainy weather, when there is a strong east or north wind blowing, or when the mercury stands below 20° F., young children are better off in the nursery. The *hardening* process, in our climate, so far from being successful, usually results in an attack of bronchitis or something worse, which may house the child for a long time, and thus deprive him of the advantage of subsequent favorable weather.

How shall the baby be taken out? The answer to this question involves the consideration of two points, namely, the clothing and the means of conveyance. The former has already been referred to.

As to the method of conveyance, the arm is to be preferred for very young infants, especially in cold weather, because they are apt to be uncomfortable in a baby carriage, and because as they must, when carried, be held close to the nurse's body,

they are kept warm by the heat given off from the bearer.

After the fourth month a carriage may be used. Now there are good and bad baby carriages, as well as a right and a wrong way of trundling them; and here again the mother must not forget that the baby is a tender creature and very easily hurt.

The best kind of carriage is none too good for the load it is destined to carry. It should run smoothly, without jolt or jar; its wheels should be provided with rubber tires and kept from creaking by the frequent application of some mineral oil, as sewing-machine oil; the bed must be soft and comfortable, lateral support being given to the body by two long, narrow and soft pillows; the infant must never be strapped down, and the parasol always must be at hand, and so arranged as to shade the tender eyes from bright sunlight.

While the carriage is a convenience to the nurse, it is never to be regarded as a place of security for the child, to be left on the sidewalk or in windy places while the wheeler exchanges gossip with fellow-nurses or enters a house to visit friends. However good its springs may be, they are never easy enough to allow of rude jolting or of mounting a raised curbstone by mere dint of hammering and muscle force.

After the age of nine or ten months a healthy

child will begin to creep; at the end of a year he will make efforts to stand, and from four to eight months later will be able to walk by himself. Children, however, present great differences in this respect, and a delay of a few months must not be considered abnormal. Second children are usually more active than those born first, since they imitate and are encouraged by the example of their elders.

As soon as efforts at creeping are made there need be no fear that insufficient exercise will be taken; the care should be, rather, to prevent over-fatigue, as the babe, delighted by its new-found powers, will be inclined to exert them all day long.

The question arises at this stage whether or not the nursery floor is a permissible field for exercise. This depends entirely upon the child's health, the state of the weather and the condition of the nursery. Remember always that the stratum of air next to the floor is much lower in temperature than the middle or upper. In some of the biting days of winter it becomes so cold as to make the feet and legs of an adult uncomfortable, and completely to chill a child, who, in creeping, has his whole body in it for long periods. Therefore, should a child be delicate, should he have either bronchitis or catarrh of the digestive tract, should the weather be very cold, or should the heating of the chamber be imperfect, it is better to keep him off the floor and let him take

his exercises on the nurse's bed, which may be stripped down to the mattress for the purpose. Colds are contracted and many more are protracted by playing on the floor in winter.

Many nurses, and some mothers, have an idea that a child should walk at a certain fixed age, and when this time arrives, put into practice various plans for teaching the process. Beware of this, for go-carts, leading-strings, baby-jumpers and all contrivances of this ilk have a tendency to flatten the chest, distort the spine, or deform the legs. The proper and only safe plan is to let the child teach himself to walk. This he readily does, first through the act of creeping, in which he exercises every muscle of the body without throwing undue weight upon the soft bones. When by this exercise he has sufficiently strengthened the muscles, he will instinctively seek to do more; first in an effort to get upon the feet, in which, though failure occurs over and over again, he perseveres until successful in standing with support, then without, and finally ends in walking.

The first acquisition of the power of walking should not be overtaxed, and for a month or more the carriage is the best means of airing; but as soon as sufficient strength is acquired for active exercise—a somewhat variable age—the child should walk out and pass as much time as the weather and nursery

requirements permit in the open air. Set walks, however, are an abomination to the child as well as to the adult. City-bred children suffer in this respect, as they are too frequently sent out merely to walk a certain number of blocks, or for a fixed time, and it is no wonder that they quickly tire of such exercise and prefer their nurseries to the streets. The only way to avoid this is to give an object to the outing, as, for example, a household errand or the purchase of a cheap toy. In the country, on the other hand, children run about and amuse themselves according to their own pleasure, visit the garden or the farm, and involuntarily take that kind and degree of exercise best calculated to promote the growth and development of their bodies.

Delicate children preëminently require pure air and an outdoor life, although many of them are too feeble to take sufficient exercise on foot. For such, when the parents' purse allows, a donkey or a pony should be provided. Driving may give sufficient exercise at first; but as soon as enough strength is gained, riding is to be preferred, as it keeps the mind more healthfully occupied, strengthens the muscles, expands the chest and produces a healthy appetite and digestion.

In the earlier years of life the girl and boy play together and take nearly the same sort and amount of exercise. As time goes on, however, and the

girl approaches nearer and nearer to maidenhood, she too frequently begins to look upon her brother's game of ball or romping play as too rough, and spends a constantly increasing time indoors acquiring the manners and the sedentary habits of her elders of the same sex.

This tendency is often encouraged by parents, who prefer polished manners to physical strength, and, above all, dislike their daughters becoming "tom-boys." One must admit that polished manners are a great attraction; but as a woman has more important duties than shining in a drawing-room, they are of little intrinsic value when uncombined with the fine carriage and good figure which belong to robust health.

In regard to the carriage and figure, it is useless to try to assist their formation by the aid of braces and corsets. The latter are especially to be condemned. Unless most cautiously used, they induce undue contraction of the lower part of the chest and displace the solid organs (liver especially) of the abdomen, interfering primarily with respiration and digestion, and secondarily with the general processes of nutrition. An erect carriage can be better secured by attention to the general health; suitable diet; regulation of the bowels; cold bathing and sponging, and exercise short of fatigue, not of particular muscles only, but of the whole frame.

My advice, therefore, is to let the girls join in the boys' play. By this plan the latter gain, because they are naturally forced to be more gentle, and the former, because their rapidly-developing frames get the requisite amount of exercise. It is well, however, to curb the ambition of the girls to equal the athletic powers of the boys, for their muscular strength is less. Without letting the subjects know, keep a strict lookout upon the general morals, for it is absurd to shut one's eyes to this risk in mingling the sexes in later childhood and youth.

Amusements.—A child's life must be devoted to the cultivation of his mind and his body, an undue development of either resulting in an incomplete manhood or womanhood.

After writing the above sentence I was called from my desk to the bedside of a little sufferer, and on my way met two boys, both about nine years of age, and both patients of mine. The first had a spirituelle face, and spoke to me with a tip of the hat and the grace of a little Chesterfield; but his features were pinched, so it seemed to me, while his face was anxious and his legs were hardly thick enough to carry his body. Nevertheless, his arms were full of books, which, as I had curiosity enough to examine, I found to be a Greek grammar, Cæsar, and the elements of algebra. I felt sorry for the overtaxed little brain, and he showed no symptoms

of joy at release from school, for he was on his way home to study all his books, to get the teacher's approval and a high mark on the morrow. Scarcely a block away I met my next little friend; his cheeks were rosy, his arms and legs sturdy, and his eyes brimful of health and fun. The burden of books he bore was light, and his teacher probably considered him stupid; but his simple "Hello, Doctor, I am off for a game of ball this afternoon," and his jolly smile were more pleasing than all the learning of the first little gentleman.

The lesson taught by these two children is very plain to my mind, and the question which will come out ahead in the long run is easily answered; for health has no handicap in the race of life.

It is right, of course, to let the children study—after the sixth year; but the brain is not to be cultivated at the expense of the body. In other words, our boys and girls must have plenty of play.

The subject of childish diversion is a broad one, and it is only possible to outline it here. Let the healthy child play as much as possible in the open air, and let him be as active as he pleases; for his own sensations will tell him when to stop and when to begin again. The only cautions are not to overlook him too much; to let him make as much noise as he wishes out of doors and in his own kingdom—the nursery; to make him play those games

which will exercise all the muscles of the body equally, and to guard him, when heated, from drinking ice-water or from lying on the cold, damp ground, or sitting in a draught. It must be remembered, also, that play is the child's business, so that during convalescence from a debilitating disease it must be regulated according to the strength.

Before closing this chapter a protest must be entered against roller-skates, as they are dangerous to life and limb. Bicycles with wheels of equal size are not objectionable, if the proper upright position on the seat be insisted upon and if the temptation to too long and too fast riding be resisted.

CHAPTER VI.

SLEEP.

For some time after birth infants spend the intervals between being fed, washed and dressed, in sleep, and thus pass fully eighteen out of the twenty-four hours. As age advances, the amount of sleep required becomes less, until at two years thirteen hours, and at three years eleven hours, are enough. The amount of sleep required will, however, vary considerably in different children, but an observant mother can soon determine this question for herself.

Any marked diminution in the average duration of sleep, or any decided restlessness indicate disease, and demand attention from the physician. At the same time, sleep, perhaps more than any other item of nursery regimen, is a matter of training, and many a mother, by want of judicious firmness, has rendered the early years of her child's life not only a burden to himself, but an annoyance to the entire household.

One cannot too soon begin to form the good habit of regularity in sleeping hours, and so far as circumstances admit, the following rules may be enforced:—

From birth to the end of the sixth or eighth month the infant must sleep from 11 P. M. to 5 A. M., and as many hours during the day as nature demands and the exigencies of the nursery permit. This does not mean that the baby is not to be put to bed until nearly midnight; on the contrary, he should practically settle for the night at six or seven o'clock, but the last feeding should be at eleven o'clock. After this he must rest undisturbed until the early morning hour, when he should be fed and sleep again.

From eight months to the end of two and a half years, a morning nap should be taken, say from 12 to 1.30 or 2 P. M., the child being undressed and put to bed. Occasionally an afternoon nap for half an hour or more seems necessary, although, as a rule, sleep at night is more undisturbed and refreshing if this be omitted. The night's rest must begin at 7 P. M. If a late meal be required, the child can be taken up at about ten o'clock, but if past the age for this, he may sleep undisturbed until he wakes of his own accord, sometime between 6 and 8 A. M. As soon as thoroughly awake the child must be taken up, washed and dressed, and given breakfast. This is the only way to cultivate the habit of early rising, which promotes both bodily and mental welfare, and of all habits is the most conducive to a long and healthy life.

By early rising it is not meant that the child shall be roused from a sound sleep by a rough voice or hand at a certain fixed hour in winter and an earlier one in the summer, simply for the whim of a fad-ridden and overprompt parent. Quite the reverse. Let the child wake of his own accord, for he will do so—whether it be late or early—after he has had enough sleep; and, if he must get up at a certain hour—and never fix it before 7 A. M.—make the rousing process as gentle and gradual as possible. Sudden rousing excites the brain, quickens the pulsation of the heart, and, if repeated, may lead to serious consequences.

From two and a half to four years, an hour's sleep may or may not be taken in the morning, according to the disposition and needs of the subject, but a child should invariably be put to bed at seven in the evening and not be permitted to rise until six or seven o'clock on the following morning.

After the fourth or fifth years, few children will sleep in the daytime; they are ready for bed by 8 P. M., and must be allowed to sleep for ten hours or more.

A later retiring hour than 9 P. M. ought never to be encouraged until after the twelfth or fifteenth year. Any postponement of the usual hour for going to bed is injurious, and should abridgment

of sleep be accompanied by the excitement of a child's party, or the like, the rest obtained is broken and productive of a pale face and nerveless frame on the succeeding day.

The position and general features of the night nursery have already been described, and it only remains to say that when occupied by day it must be darkened so as to favor sound sleeping.

The bed (and where there are several children in the family each should have its own) must be so situated in the room as to be out of the way of draughts. Curtains, while they protect, prevent the access of fresh air, and it is far better to ward off a draught by a movable, folding screen.

The form of bed known as a crib may be occupied until the sixth year. The sides must be high, to prevent the child from falling out and injuring himself, and the movable side should work upon hinges rather than move up and down in slots.

Springs and a soft horsehair mattress, protected by a gum cloth, placed beneath a double sheet, under ordinary circumstances constitute the bed proper. Sometimes a feather mattress is admissible, but this is only when the child is feeble, and requires artificial aid to keep up the normal body-heat during sleep.

The objection to feathers is, that the body, sinking deeply in, is so completely enveloped that it is

subjected to an undue degree of heat, which relaxes and weakens the system and renders it very susceptible to the injurious influences of cold.

The bed covering is composed of a sheet, one or more blankets—according to the weather—and a spread. These must be warm enough to maintain a healthy temperature, but, at the same time, not so heavy as to oppress the child.

Special care should be taken not to cover the nose or mouth, and it is much better to keep the air of the nursery at a proper, even temperature by an open fire than to secure warmth to the body alone by weighty bed coverings.

The pillow ought to be small, rather thin than the reverse, and made, except for very young infants, of soft horsehair.

A bed should never be made up directly upon the child's leaving it, for then it is saturated with the nocturnal exhalations from the body. When vacated, the bed coverings must be thrown over the backs of chairs, the mattress shaken up, and, the windows of the chamber being thrown open, allowed to air for an hour or more.

In the matter of bed clothing, cleanliness is as important as in body clothing, and the nurse must never neglect to remake a bed if the sheets become wet with urine or otherwise soiled, no matter at what hour of the night the accident may occur.

Much trouble in this direction may be avoided, however, by regularly taking up the child at the time of the last feeding and encouraging a thorough evacuation of the bladder.

Children should never sleep in the same room with persons who are ill, whether the disease be acute or chronic. Sleeping with those having a long-standing cough or consumption of the lungs is especially to be avoided. Do not get the baby into the habit of being rocked or walked to sleep, and do not allow older children to sleep too soon after a meal, as the processes of digestion are apt to produce restlessness and uneasiness. Again, a bright light or conversation in the bedroom should never be permitted after the children have settled to rest.

Finally, teach the nurse to make up the bed neatly and smoothly, and direct her to turn the pillow and smooth out the sheets, should her charge be restless at night. By this latter procedure sound sleep is often brought to a fretful child.

CHAPTER VII.

BATHING.

A well-known English writer states that "water to the body—to the whole body—is a necessity of life, of health, and of happiness; it wards off disease, it braces the nerves, it hardens the frame, it is the finest tonic in the world."

On the word "tonic" the whole subject hinges. Every one knows that food, even in such a simple form as milk, may be given to excess, with the production of illness, and that medicines are yet more easily abused. Why, then, if the bath be a *tonic* agent, may it not be often used injudiciously and to the detriment of the child?

Intelligent nurses, who have grown gray in service, often say they have seen babies "washed into heaven." This act has never been actually accomplished in my experience, but it has been often enough approached to justify introducing this chapter with the caution that, should the infant be ailing, the bath had better be discontinued until the physician can be consulted. This, of course, does not preclude ordinary cleanliness, for every part of the child's body liable to become soiled can be readily

cleaned by the use of a moist sponge, with or without soap, and without bringing into play any of the medicinal or, in other words, tonic effects of the bath.

The initial bath is to be given as soon after birth as the nurse, having made the mother comfortable, can turn her attention to the child. This bath differs somewhat from those that succeed it during infancy in the fact that it involves a special procedure, namely, the removal of the tenacious, paste-like material which usually adheres to the skin of the new-born.

This substance, the *vernix caseosa*, is a fatty varnish or deposit secreted by the glands of the skin. While the fœtus is in the womb, it probably acts as a protecting agent, but if allowed to remain long after delivery it becomes dry and hard, and, in addition to impeding the healthy activity of the skin, leads to excoriations or various eruptions.

To remove it, first rub the whole surface gently, though thoroughly, with a bit of flannel covered with fresh lard or olive oil; next, wash off the softened and greasy coating with a cotton sponge saturated with warm water and soap, and finally complete the bath by immersing the body in warm water (100° F.) for one or two minutes.

After this preliminary cleansing, one bath a day

should be the rule until the completion of the third year of life.

The monthly nurse must bathe the child while she remains in attendance; afterward the mother is the proper person, unless the nurse-maid be exceptionally careful and experienced; and even in this event the mother should superintend the process.

A tub with a supply of water, a piece of soft flannel for a wash-rag, a fine sponge, a bit of good soap and several soft towels are the necessary arti-

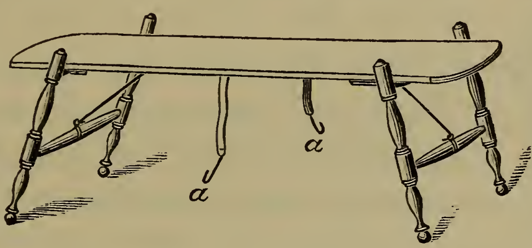

Fig. 15.—Bath Table.
a, *a*, elastic tapes for steadying tub.

cles. A long apron made of soft flannel is also useful, and it is well to provide a low chair and a piece of oilcloth to place on the floor underneath the tub. The former enables the bather to get more on a level with her work and make a deeper lap for the child to rest in, and the latter receives any water that may be splashed about. A stand is now made to hold the baby's bathtub, Fig. 15, and is so contrived that it can be folded up and laid away when

not in use. It is convenient, inasmuch as it obviates the necessity of stooping over, by bringing the child more on a level with the bather. It has straps and hooks attached to the sides to hold the tub firmly in place while in use.

An ordinary oblong tin tub, painted white inside and large enough to give plenty of room, is to be preferred to either a porcelain basin or a wooden tub. When in use, the tub should be placed on the floor, for the sake of firm support, or on the bath table, and afterward must be well cleaned, dried and aired.

Water for the bath ought to be pure and *soft*, and should it be muddy or otherwise foul, the nurse must take the trouble to filter it. The character of *softness* is an important one, and when it is impossible to obtain anything but *hard* water from the ordinary sources of supply, a special provision ought to be made for the collection of rain water. The quantity used at a time should be sufficient to cover the child up to the neck when placed in the tub in a semi-reclining position.

A matter of great importance is the temperature of the water. Some—fortunately very few—people use cold water from the first, under the impression that it is strengthening. So far from this being the case, cold water, instead of hardening, depresses the vital forces and frequently produces inflamma-

tion of the eyes, nasal catarrh, and inflammation of the lungs and bowels.

While cold baths are not to be recommended, one must not go to the other extreme, and use too hot water; for this also weakens the frame and renders it more susceptible to the attacks of disease.

After the initial bath the temperature should be gradually lowered, and by the end of the fifth month from ninety to ninety-five degrees Fahrenheit in winter, and from eighty to eighty-five degrees in summer are the proper temperatures. As the heat of water cannot be estimated by the hand with any degree of accuracy, it is essential to use a bath thermometer (Fig. 16).

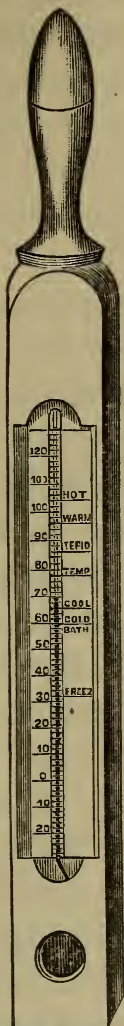

FIG. 16.—BATH THERMOMETER.

Place this instrument in the water and allow it to remain a few moments, so as to get a full effect upon the mercury. Should the water be too hot, it may be readily cooled by the addition of cold water, or, if too low in temperature, as easily raised to the proper degree by pouring in hot water.

It is impossible to insist too strongly upon the

necessity of uniformly using the bath thermometer. Several times in my experience a tin bathtub has been filled with water so hot that its sides burned the delicate skin of the little hand placed upon it. Fortunately, in such instances, the consequent screams led to careful investigation, and no serious damage resulted. On the other hand, I have felt the water cold enough to pain the fingers. Don't neglect the thermometer, then!

A piece of flannel is very useful for the first part of the bathing. It readily takes soap, and, being soft, can be thoroughly rubbed over the skin without danger of injury. A large, soft sponge, however, is best suited to the finishing of the bath, for it holds more water than a flannel wash-rag, and enables the bather to stream the water over the child's body, and thus get the stimulating effect of a miniature shower bath at the same time that the dirt and superfluous soap are washed away from the surface. The wash-rag and sponge must, by the way, be the child's exclusive property, and are not to be used twice in succession without being thouroughly cleaned and dried in the open air.

Unscented Castile or glycerin soaps are the best to use. Common soaps are irritating to the skin, and even the purest and most bland articles must be employed with care, that is, neither too frequently nor too profusely, lest they lead to ecze-

ma or other cutaneous disorders. When any skin disease is present, the physician's advice must be had not only as to the use of soap, but also in reference to the propriety of the bath itself.

Two towels are required for each bath. These should be large and composed of fine, soft material. They must be dry and warm, and perfectly clean before they are applied to the surface of the child.

The bath apron should be made of two pieces of soft, white flannel; one long enough to extend from the waist almost to the feet of the bather, and broad enough to completely cover the front of her gown; the other quite as broad but about four inches shorter. Both pieces are sewed to a waist belt, forming, in reality, two aprons; the upper of which is thrown over the shoulder when the infant is being lifted from the tub, and then used as a dry and warm covering when he reaches the lap. After the bath, the apron, being more or less wet, must be taken off and thoroughly dried. Several such articles should be provided, as they must be frequently washed to keep them clean and free from odors.

Any low chair will do to use in bathing, although as those usually sold have not a sufficiently broad seat to give a comfortable support, it is better to make one by sawing off the legs of an ordinary wooden kitchen chair.

The bath must be given at a regular time each

day. The best hours are in the morning, midway between two feedings, at ten o'clock, for instance; and in the evening, just before the infant gets his last feeding and goes to bed. The first is perhaps the better hour, but regularity is the more important point.

At the time selected, place the tub containing the water, heated to a proper temperature, in a warm and sheltered part of the room, and around it arrange, within convenient reach of the hand, the various requisites of the bath.

Upon undressing the child, wet his head first; then let the head and shoulders rest on the left forearm and lower the child gently into the water, that his body may be covered as far as his neck. Take a wetted and soaped flannel wash-rag in the right hand and pass it rapidly but thoroughly over the body, avoiding the eyes. Pay particular attention to the arm-pits, to the region between the folds of the buttocks and to the groins. This done, take a large, well-filled sponge in the right hand and squeeze the contents over the body. The chief force of this miniature douche must fall upon the back and loins, and the child, during the operation, must be lifted clear of the bath-water by the left arm and hand.

The sponge is used simply to clear off the dirt loosened by the wash-rag, and to remove all super-

fluous soap; therefore, when this is accomplished, the child should be lifted from the tub to the lap and enveloped in a towel, or, better still, in the loose folds of the bath-apron. The drying process now begins and consists in *absorbing* the moisture from the skin. This is done by a series of very gentle patting movements with a towel folded over the palm of the hand. In drying a baby, special attention must be given to those portions of the body where the natural folds form crevices in which water may lodge. Unless these parts be thoroughly dried, serious consequences may ensue. If it be retained in a normal crevice—the fold of the buttocks or behind the ears—it causes in a short time troublesome excoriation.

"Never allow anything smaller than the elbow to enter the ear" is excellent advice; although during the bath should water get in and be allowed to remain it may lead to earache and abscesses, and in extreme, though not rare, cases, to deafness. In the event of this a blunt cone formed out of a soft handkerchief will quickly absorb the moisture, and will do no harm if inserted but a very short distance within the orifice.

The nose can readily be cleaned by the soft cone-shaped handkerchief, especially if a little vaseline be added to facilitate the process.

After the infant is patted perfectly dry—not rudely

rubbed with a towel—the whole surface, but especially the region on either side of the spine, should be rubbed with the naked palm until the skin becomes slightly red. This modified massage ends the bath, and the child must then be dressed as quickly as possible.

Several important points yet remain to be mentioned. Never give a bath immediately after a meal nor when the child is either cold or overheated. Never suddenly or rudely plunge the body into the water, and never allow the time of actual immersion to exceed five minutes. Under no circumstances should the head and face be allowed to dip beneath the surface. Should this happen, the child will become so frightened that it will be difficult to get him to enter the water again. And here, by the way, it may be well to state that if there be repugnance to the bath, the tub may be covered over with a blanket, and the child, being placed upon it, may be slowly lowered into the water without seeing anything to excite his fears.

While the infant's head should be wet before each bath, it must not be washed every day. Too frequent cleaning and the too frequent use of soap dry the skin and lead to seborrhœa or other cutaneous disorders; once a week is quite often enough to wash the scalp.

The question of the propriety of using powder

after a bath is often asked by mothers. Powdering has always seemed to me to be a lazy way of absorbing the moisture that should be taken up by a dry towel, and unless there be some excoriation or other indication for its use, the skin can be kept cleaner and healthier without it. In cases, too, in which some disorder of the skin would seem to warrant its employment, better and quicker results are ordinarily obtained by the application of cold cream, oxide of zinc ointment, or vaseline.

The rule of one bath a day may be exceeded in very hot weather, when, in addition to the morning full bath, the body may be sponged twice daily with water at a temperature of 85° to 90° F. This, contrary to what might be expected, has a greater and more permanently cooling effect than bathing with cold water.

From what has been written, one might suppose that the details of an infant's bath are endless. So they must seem when given in full. A skilful bather, however, ought to fulfil every requisite and complete the bath in a period of time not exceeding twenty minutes at the very outside, and this must include not only the actual five minutes' immersion, but the preparation of the bath and the drying process.

After the third year three full baths a week are quite sufficient. An evening hour is now to be

preferred, but the water must be heated to 90° F. in winter, though it may be cooler in the heat of summer. While, at this age, the child has his three full baths weekly, for the purpose of securing absolute cleanliness he must be sponged every day with water, cool or warmed to the season.

The sponge bath is best given in the morning, soon after the child has roused himself from sleep and before any food is given. The nurse, for this, must provide herself with a large basin containing water at a temperature of 75° in summer and 85° in winter, a large, fine sponge and several towels. The bath-apron being donned and the child's night-clothes removed, the sponge filled with water is passed rapidly over the whole surface of the body; then the child must be wrapped up in the apron and the skin first dried gently with a soft towel and then rubbed into redness with the open hand. When this process is completed—and it should be done in at least ten minutes—the clothing is put on rapidly, and the child is ready and usually hungry for his morning meal. No soap need be used in these baths.

In the tri-weekly cleansing bath the process of washing is much the same as in infancy. That is, the bathtub being filled with water at a temperature of about 90°, the child is put into it up to his neck and thoroughly soaped with a wash-rag, and next

douched clean with a large sponge. Here, also, the head must be wet first; the body immersion must not last longer than five minutes, and the drying must be done quickly and with a patting rather than a rubbing movement. Ample reaction of the skin must be secured by gently rubbing with the palm of the hand, especially over the spine.

The washing of the head is a most important matter, as it cleanses the scalp, prevents the formation of scurf, and adds beauty to the hair. At the same time the nurse must be careful how she dries the hair. To rub it gently with a soft towel and then brush it out with a fine hair brush is the proper plan. Combing, in so far as it means dressing the hair and cleansing the scalp with a fine comb, must never be allowed, as it not only thins the hair by pulling it out by the roots, but also irritates the scalp and produces eruptions upon it.

As the child approaches puberty he must gradually be taught to wash himself, and should be encouraged to form the habit of bathing every day. The bath at this age should be a sponging rather than a soaking process; it is best taken in the morning directly after rising, and the temperature of the water may range from 65° to 75°, though delicate children may require it warmer, especially during winter weather.

When childhood merges into youth, while the

sponge is still preferable to the plunge, water may be used, all the year round, just as it flows from the faucet. The temperature will be, of course, quite low at times, but so long as the bath is taken in a warm room, completed quickly, and followed by a sense of stimulation and warmth, nothing but good results.

Whatever room be used for the purpose of the toilet, the child, if he be old enough to bathe himself, should occupy it alone, so that the whole body may be stripped naked; otherwise washing cannot be thoroughly or effectually accomplished.

A boy should wash his head each morning; a girl, who has long hair, at least once a week. Any loitering over the bath is attended with the danger of chilling. Never occupy more time than fifteen minutes in the whole process.

These daily sponge baths are ordinarily quite sufficient to keep the person perfectly clean. Sometimes, however, it is necessary to take, in addition, a full warm bath at intervals of a week. These baths are relaxing if too prolonged; ten minutes is the maximum time for remaining in the water. After leaving the tub there must be no exposure to draughts. The best hour for such a bath is in the evening; some time after the last meal and just before going to bed.

Sea-water baths are useful for a child of any age,

although ordinary sea bathing is not to be recommended until the child is old enough and strong enough to hold his own in a moderate surf—after the eighth year, for instance. A younger subject may, when at the seaside, be dressed daily in a bathing suit and allowed to splash for a time at the edge of the surf. The process of carrying a child against his will into the waves and immersing his head, as is often done, is cruel and productive of so much terror that more harm than good results.

In our climate, the proper season for sea bathing is from the middle of June until the middle of September.

On arriving at the coast, it is always well to prepare for the plunge in the sea by giving, on the first day, a warm salt-water bath. On the day following, about three hours after breakfast, the child may don his bathing dress. Immediately on entering the water, the head must be thoroughly wetted. After this, the bath may be protracted for fifteen, or at most twenty, minutes. To get the invigorating effects of a surf bath, it should never be repeated oftener than once a day, and in some cases it is better to allow a day to intervene, or even to enter the water only twice a week. Drying and dressing should be rapidly performed, and a half-hour's brisk walk is very useful in promoting reaction and causing free circulation of the blood.

Should the bather feel faint after coming out of the water, he must be wrapped in towels and given half a tumblerful of milk containing one or more teaspoonfuls of brandy or whisky, and the succeeding baths should be at longer intervals and for shorter periods, or they must be discontinued if their effect is uniformly depressant, and a daily sponge bath of equal quantities of salt and fresh water substituted. When the child is either cold or perspiring freely, the bath must not be undertaken.

The bathing suit should be of light flannel, made in one piece like a pair of moderately loose night drawers, but with short arms and legs; it should open only over the shoulders, where, when put on, it is fastened by buttons. This arrangement permits of easy removal after the bath when the flannel is saturated with sea water, and is, in consequence, heavy and sticky.

The question of sea bathing suggests that of swimming. Boys, and girls also, should early learn to swim. The art is not only a safeguard, but a means of most pleasant and invigorating exercise. It develops the muscles, expands the chest, aids digestion, strengthens the whole frame, and promotes energy, courage and self-reliance.

Swimming, like every other exercise, must be taken in moderation. Even with this care it is not always beneficial. The bather should leave the

water experiencing a pleasant glow over the whole surface of the body; the spirits and appetite should be increased, and there ought to be a sensation of augmented strength. If, on the contrary, it should disagree, there is a sense of chilliness, with lassitude and depression of spirits; the face is pinched and pale, and the lips and finger-nails are apt to look blue.

Swimming in salt water is more invigorating than in fresh. Apart from the different quality of the two waters, the battling with the waves in the former case is more exhilarating, and the sea breezes, blowing upon the body, carry with them health and strength. Every one must have noticed the increased softness and beauty of the skin and the greater lustre of the hair after a sojourn at the seaside.

It may be serviceable next briefly to detail the different baths in common use as well as those most often directed by physicians, with some reference to their effects upon the system.

Concerning temperature, the bath may be:—

1. Cold,	temperature	50° to	65° F
2. Cool,	"	65° to	75° "
3. Temperate,	"	75° to	85° "
4. Tepid,	"	85° to	92° "
5. Warm,	"	92° to	98° "
6. Hot,	"	98° to	112° "

When giving a *cold bath*, strip the child in a warm room, and rub him thoroughly with the palm of the hand until the whole body, especially the spinal region, is warm. Let him then stand in a tub containing enough hot water to cover the feet, and sponge him rapidly with cold water. The temperature of the latter must never be below 50° F., and 60° is usually cold enough. The addition of half an ounce of rock salt or a tablespoonful of concentrated sea water to the gallon, renders it more stimulating and insures a complete reaction. After sponging, the surface must be thoroughly and quickly dried with a soft towel and rubbed with the open hand until aglow.

This bath, provided the degree of cold does not exceed the resisting powers of the child, is a powerful tonic, producing rapid tissue changes and increasing nutrition. Should the water be too cold, or the sponging continued too long, reaction does not follow the primary shock, and the result is fatigue, exhaustion, or even dangerous prostration. This bath, therefore, must be used with caution and only under a physician's advice. The cases in which it is of most service are those in which there is a sluggish circulation with poor appetite and feeble digestion; in which the nutrition is impaired, as in rickets, and in certain spasmodic nervous disorders.

A *cooled bath* is sometimes prescribed, and may be employed with advantage in conditions attended with very high fever. The child is first immersed in water at 95°, and this is gradually lowered to 70° by the addition of cold water, the process occupying from fifteen to thirty minutes.

Analogous to this bath is the *cold pack*. Fold a sheet in such a way as to be long enough to extend from the child's arm-pit to his feet, and wide enough to encircle completely his body; dip it in water at 80° and lay it smoothly upon a cot, the mattress of which must be protected by a rubber mackintosh. When all is in readiness, place the child upon the sheet, and wrap it around his body and legs. A blanket must then be thrown over the sheet and the pack left undisturbed for ten minutes. Then lift the child out quickly and envelop him in a warm blanket and allow him to remain at rest for some little time.

In the absence of the physician, sponging with water at a temperature of 70° or 80° is the only safe bath to employ to reduce temperature. In giving this bath, strip the child and place him in bed between blankets, while the nurse, inserting her hand between, must pass a damp sponge slowly over the surface. Five to ten minutes may be consumed in this operation, although if the child complain of chilliness, discontinue the sponging at once;

a sensation of cold, too, indicates the use of warmer water. The operation may be repeated several times daily, or as often as every two hours in urgent cases, and when the heat reduction is of short duration.

The *hot bath*, 98° to 112°, is employed for various purposes,—to relieve nervous irritability, to promote sleep, to produce sweating, and to draw the blood to the surface in the event of congestion of some internal organ. Whether a full bath or merely a foot bath be required, five minutes is sufficient time for immersion; then, with or without drying, according to the degree of sweating desired, the whole body, or only the feet and legs in case of a foot bath, must be enveloped in a blanket, and the child put to bed. To render these baths more stimulating, a teaspoonful to a tablespoonful of mustard flour may be added, and the child held in the water until the *arms* of the nurse begin to tingle. The hot bath is purely stimulating, and it is important not to continue it too long, lest the primary and only desirable effect be followed by depression.

The *blanket bath* is useful in producing perspiration. Wring a blanket out of hot water and wrap it around the child: then throw three or four dry blankets over him and leave him for half an hour. Rub the body then with a soft towel to absorb the moisture thoroughly, and keep the child in bed.

There are several medicated baths in frequent domestic use, which it may be useful to describe.

Mustard Bath.—Take from two teaspoonfuls to two tablespoonfuls of mustard flour; hot water, two to four gallons.

In the form of a foot bath it produces sweating and determines the blood to the surface. As a general bath it acts as a powerful stimulant.

Salt-water Bath.—Take four tablespoonfuls of rock salt, or Ditman's sea salt, or concentrated sea water; water, warm or cool, according to season, four gallons.

To be used as a general bath every morning in chronic tuberculosis, scrofula, rickets, and general debility. Bath to be followed by thorough rubbing of the surface, especially over the spine.

Bran Bath.—Take one pint of bran; tie up in a muslin bag, place in a quart of water, boil for an hour, squeeze bag thoroughly into the water, and add to four gallons of warm water.

Useful in eczema and other skin diseases.

Soda Bath.—Take one tablespoonful of bicarbonate of sodium; warm water, four gallons.

Used in skin affections.

Hot air or Vapor Bath.—The body-clothing being removed the child is laid upon a bed, the bed-clothing is pinned tightly about the neck so that the head only is outside, and raised about a foot above

the body by an arrangement of hoops on a wicker support. Hot air or vapor is then introduced beneath the raised bed-covering from a croup-kettle. This bath causes free perspiration in from ten to twenty minutes, and may be continued for twenty or thirty minutes unless faintness or giddiness be produced, when it should be stopped at once. Such baths are especially useful in case of suppression of the urine, and in uremia.

Disinfectant Bath.*—Take six and one-half ounces of liquid carbolic acid (90%), four ounces of glycerin, and four gallons of warm water (98° F.); or six ounces of solution of chlorinated soda and six quarts of warm water. Applicable for disinfection of the person after an attack of scarlatina or other contagious disease. Neither of these solutions is as efficient as bichloride of mercury in the proportion of 1 to 5000, but this is such a poisonous substance that it should never be used without a physician's oversight.

Compresses are often useful. The wet compress consists simply of a roll of flannel or soft linen dipped in cold or hot water, according to circumstances, and wrung out and then applied to the part indicated. Cover this with a piece of oiled silk rather larger than the compress.

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* See Chapter XI.

There are several matters that bear a more or less close relation to the subject of bathing. These are the care of the teeth, nails and hair.

The teeth must be cleaned morning and evening, and the cleaning process must be begun with the appearance of the first tooth. Ordinarily, a soft wash rag folded over the forefinger, dipped in cool water and thoroughly rubbed over the teeth, is sufficient to keep the early teeth clean, and does not injure the tender gums. Should a dark-colored scum form at the junction of the tooth and gum, a little prepared chalk or other bland tooth powder may be used in addition. If it be impossible to get at the point of discoloration in this way, shape with a penknife a moderately hard bit of wood into the form shown in Fig. 17, then rub the woody fibres at the extreme end into a sort of brush, wet this, dip it in the toothpowder and gently rub at the discoloration until it disappears, taking care not to make the gum bleed. Over a piece of wood so shaped one may also wrap a bit of soft cambric and use water and powder as before.

Fig. 17.—Stick for Cleaning Teeth.

Take good care of the milk teeth, for if they become decayed and broken off or lost, their permanent

substitutes are apt to come in irregularly and produce a lasting deformity.

The tooth brush can be used after a number of the milk teeth have been cut. The bristles should be very soft and fine, and it must be employed with gentleness. Unless there should be some discoloration, no powder need be used. The child should early learn to clean his own teeth.

The importance of taking care of the toe-nails has already been referred to in the chapter on clothing. The finger-nails should not be allowed to grow too long; at the same time it is a bad plan to cut them close to the quick. In trimming them, use a moderately dull pair of scissors, and do not round them too much. When hang-nails appear, they must be cut close with sharp scissors. The fingers and toes should be inspected carefully after each bath, to see if they require attention.

Directions have already been given in regard to washing the hair. All that remains to be said now is to repeat the caution against the use of a fine comb, and to protest against the employment of hair oil and hair washes. The best scent for the hair is an occasional dressing of soap and water; the best beautifier is a thoroughly good brushing with good brushes, and the latter should be employed every morning and evening.

Besides keeping the long hair of a girl free from

scent and grease, do not dress it over the ears or tie it up tight and make it "like a cap of iron over the skull."

If the hair be well brushed and the scalp thus sufficiently stimulated, there will be enough natural oil secreted to keep it tidy; artificial oily applications only act temporarily, and by blocking up the pores of the skin tend to make the hair drier and harder to keep in order.

Should there be a tendency for the hair to fall out, wash the scalp thoroughly and frequently with soap and water, and stimulate it by firm brushing and the use of a wash such as the following:—

Take of—

Aromatic spirit of ammonia,	1 fluidounce.	
Tincture of cantharides, ...	1½ fluidrachms.	
Glycerin, ...	½ fluidounce.	
Rose water, ...	7 fluidounces.	Mix.

A tablespoonful of this may be rubbed into the scalp once every day, the rubbing to be followed by washing with a sponge and vigorous brushing.

In such cases, however, it is best to seek the advice of a physician, for falling out of the hair may be due to a variety of causes.

CHAPTER VIII.

FOOD.

The choice of food and the method of feeding bear so close a relation to age that it is necessary, in studying these questions, to regard them from the stand-point of the two stages of a child's life mentioned in the first chapter; that is to say, the periods of infancy and childhood.

Infancy.—An infant may be fed in one of three ways: 1, from the mother's breast; 2, from the breast of a foster-mother or wet-nurse; and, 3, from a bottle, by the method known as artificial or hand-feeding.

1. *Feeding from the maternal breast.*—There can be no doubt that this, being the natural, is at the same time the proper method of nourishing the human infant; and fortunate is the babe that, in our day of advanced civilization and city living, can draw from the breast of a robust mother an abundant supply of pure, health-giving, tissue-building food.

It follows, therefore, that every woman who is free from certain contraindicating diseases, to be mentioned later, should nourish her child solely

from her breast up to the age of eight months, and partially to the end of the first year, or, failing in either limit, as long as possible.

The infant should be put to the breast as soon as the mother has recovered somewhat from the fatigue of labor—some four or eight hours after birth. Of course no milk can be drawn at this early date, but the babe gets a small quantity of thin, watery fluid, called colostrum, which affords sufficient nourishment, and at the same time, from its laxative properties, clears away the greenish or black viscid material that collects in the infant's intestinal canal during intra-uterine life. This procedure, too, is of great advantage to the mother, for it insures proper contraction of the womb, draws out the nipples, and encourages the formation of milk.

As the secretion of milk is never fully established until the third day after labor, it stands to reason that no food other than the colostrum is required before that time. Hence, the practice of filling the infant's stomach with gruel, sugar and water, and other sweetened mixtures, is more than useless, for it diminishes the activity of sucking and the consequent stimulation of milk production. Put the child to the breast every two hours while the mother is awake, and there need be no fear of starvation.

After the third day, should the breast not yield a supply of milk, a mixture of cream, two teaspoon-

fuls, whey and water each three teaspoonfuls, and one-fourth of a teaspoonful of sugar of milk, may be given every fourth hour, the babe being put to the breast in the meanwhile. When the flow begins, however, the artificial feeding is to be discontinued.

Usually on the fourth day milk is secreted and regular lactation commences. Many untrained mothers make a failure of nursing because they know nothing of the manner of giving suck; of the length of time the child should be kept at the breast; of the proper time for and interval between feeding, and the importance of regularity. Upon these points the physician should give minute instructions.

When giving the breast, the infant must be held partly on its side, on the right or left arm, according to the gland about to be drawn from, while the mother must bend her body forward, so that the nipple may fall easily into the child's mouth, and steady the breast with the first and second finger of the disengaged hand, placed above and below the nipple. In case the milk runs too freely—a condition very apt to excite vomiting—the flow is easily regulated by gentle pressure with the supporting fingers. Each of the breasts should be drawn alternately, the contents of one being usually sufficient for a meal; and a healthy child may be allowed to

nurse until satisfied, when he will stop of his own accord, drop the nipple and fall asleep with milk still flowing over his lips.

During the first six weeks the breast is required every second hour, from 5 A. M. until 11 P. M. At night the infant should be put in a crib by the mother's bed, or in an adjoining room, under the care of a competent nurse, and there remain quietly until the morning feeding. This secures the mother six hours of uninterrupted repose, a matter of great importance to her general health and consequent capacity for prolonged lactation. As to the infant, he may rebel at first, and wake and cry, so that it is necessary to quiet him with a little milk and water administered from a bottle; but often, after a few days and certainly at the end of a week or two, the good custom of sleeping at night is formed, and there is no further trouble.

Regularity in meal hours is even of more importance in early than in adult life, on account of the natural feebleness of digestion. To secure this, it is only necessary to have a little perseverance, for infants are such creatures of habit that a short training brings them into the way of expecting food only at certain times, and, when healthy, they wake to suck the breast with almost the precision of the clock. While insisting upon this rule, one must recognize the fact that, although in the vast majority

of instances a two-hours' interval is most suitable up to the second month, there is no absolute law as to the number of daily nursings. Some infants seem to need food less frequently, and it is best to respect their peculiarity and not force the breast upon them so long as they sleep well, do not fret when awake, and thrive generally. Others, again, may require it oftener, every hour and a half, perhaps, and once or twice at night. In these exceptional cases an appropriate schedule can only be made by close observation of individual characteristics.

A common and most ruinous mistake is to resort to constant feeding as a means of pacifying crying. Babies certainly do cry from hunger, but just as frequently the crying results from colic, or from the discomfort and pain of indigestion. Every mother should be able to recognize the difference. The cry from hunger usually begins after a sound sleep. It is not peevish, and stops at the sight of the breast, when the infant rouses himself, presents an expression of pleasure, clinches his hands and flexes his limbs. The cry of colic is violent and paroxysmal; the face is livid and wears an expression of suffering; the abdomen is distended and hard; the hands and feet are cold; the legs are drawn up or kicked violently about; and an explosion of wind from the mouth or bowels ends the attack. A

peevish cry, hot skin and sour breath attend indigestion.

It stands without saying that the cry of hunger must be relieved by giving food; but this is the very worst thing to do under other circumstances, for it both breaks up good habits and produces serious mischief. The pain of colic and the discomfort of indigestion are chiefly due to the accumulation of flatus resulting from the fermentation of food. Mothers soon learn, and unfortunately infants too, that the breast milk temporarily relieves suffering. This it does in the same way as any other warm liquid; but, unlike a simple fluid, milk only adds more material to the already fermenting contents of the gastro-intestinal canal, and every nursing is soon followed by more pain, until between crying and sucking and sucking and crying, the infant's life is passed in misery, if not cut short altogether. Instead of continuous feeding, the plan for relief is to decrease the quantity of food by increasing the intervals between nursing and by abridging the time of lying at the breast, while medicines are employed to strike at the root of the evil.

After the sixth week the interval between nursings may be slowly increased until, by the fourth month, it reaches three hours. During this period, also, the time of lying at the breast may be gradually lengthened, for the quantity of milk secreted

and the child's appetite and capacity for food are all augmented as the days pass by. At the end of the sixth month, feeding every fourth hour suits some children well, but as a rule the three-hour interval must be adhered to from the fourth month to the end of lactation.

Many authorities recommend additional artificial feeding, alternating with nursing, after the sixth or eighth month. Such a plan is perfectly proper, if the babe ceases to gain strength and flesh while on the breast. If otherwise, the maxim of not interfering with any course that is doing well is as applicable here as elsewhere, and the breast may be relied upon entirely until the time comes for weaning.

Should additional nutriment be required, the food must be selected with due reference to age and prepared in the same manner as in regular hand-feeding.

The date of weaning cannot be fixed for all cases, since it must depend upon two conditions,—the health of the mother and the development of the child. When the former continues to be robust and the child steadily grows and gains flesh, lactation can be prolonged until the tenth or twelfth month. If persevered in longer, the mother's strength begins to fail, her milk is lessened in quantity or becomes poor in quality, the child's nutrition suffers, and he grows pale, thin and flabby,

and may develop the disease known as rickets. Notwithstanding the age, the beginning of summer is a bad time to wean an infant, and unless the indications for withdrawing the breast are very urgent, it is better to postpone the change until the hot months have passed, resorting, in the meantime, to artificial feeding as a supplement to any deficiency in the maternal supply.

Change in the manner of feeding may be accomplished gradually or suddenly. In gradual weaning, about four weeks are required to prepare for the absolute withdrawal of the breast. For instance, if suck be given every three hours, from 5 A. M. until 11 P. M., or seven times a day, there should be, during the first week of preparation, one artificial feeding and six nursings daily; during the second, two and five; during the third, four and three; during the fourth, six and one. Then the breast must be entirely withheld. Carefully prepared milk-food, administered from a bottle, is the best substitute. At the age of ten months a mixture that ordinarily agrees well is:—

℞. Cream..............1 tablespoonful (fld. oz. $\frac{1}{2}$).
Milk...............8 tablespoonfuls (" " 4).
Sugar of milk......1 teaspoonful.
Water............3 tablespoonfuls (" " $1\frac{1}{2}$).

This is to be poured into a perfectly clean bottle, warmed in a water-bath, and taken through a clean,

plain rubber tip. Should the quantity (six fluidounces*) be insufficient to satisfy the child's appetite, the milk and water may be increased until the mixture measures eight fluidounces.

When such accidents as fever or disordered digestion, with vomiting and diarrhœa, occur during the period of preparation, the number of artificial feedings must be reduced, or the breast resumed until the disturbance be passed; then the course may be begun again and carried to its completion.

Usually there is little trouble in weaning infants in this way. Sometimes they become fretful under the change and may refuse food entirely for a day or more; but a little determination on the part of the mother and the cravings of hunger will soon overcome this difficulty.

Occasionally the child refuses to suck milk from a bottle or to drink it from a cup or spoon—in fact seems to object to any form of liquid food except that drawn from the mother—while at the same time he is eager for bread or other solid food. Under these circumstances prepare for each meal a moderate portion of either rice pudding or junket. After these have been taken for a day or two, add to each meal a little milk, reducing the amount of

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* One fluidounce = two tablespoonfuls.
One fluidrachm = one teaspoonful.

pudding or junket; stir the whole together and feed from a spoon; next day still further reduce the solid and increase the liquid, and so proceed until finally a taste for milk is cultivated.

Sudden weaning is not advisable unless, while the breast is being presented, there is an absolute refusal to take artificial food from either a bottle or a spoon. This is most apt to occur when food has been given too frequently, and when the breast has been used as a means to quiet crying. The plan is also to be recommended when the mother's health becomes so affected as to render any further suckling a positive peril to the child's life; attacks of erysipelas or of small-pox are instances in point.

The physician is often forced to decide upon the advisability of premature weaning. His decision must be made cautiously and after thorough investigation of two propositions, namely: *a*, the effect of further lactation upon the health of the mother, and *b*, the requirements of the child.

a. Lactation being a physiological process is not a drain upon the systemic strength so long as the functions of nutrition are actively performed, but under other circumstances it very frequently becomes so. Premature weaning is necessary when the mother is attacked by any acute disease threatening dangerous temporary prostration, such as typhoid fever. A change must also be made if

pulmonary consumption be developed, or, being already present, rapidly advances under the drain of milk secretion. Ordinarily, however, the general condition that leads to withdrawal of the breast is one of simple loss of strength and flesh on the part of the mother.

Undoubtedly these indications often warrant the procedure, but every one who has seen much of children's practice must have met with many cases in which the advice to wean has been given carelessly and unnecessarily, and in which the child might have had its natural food had proper attention been given to the health of the mother.

If a woman be worn out by household cares; if she wear herself out by a round of dinners, balls or shopping, or if she expose herself to injurious atmospheric conditions and eat improper food, she grows weak and thin whether she be nursing or not; and a woman heedless of her health will probably care little whether she suckles her child or gives it up to a wet-nurse or to the bottle.

In addition to making nursing the important duty of her life for the time being, a mother must be as free from household cares as possible. Mental and physical fatigue must be avoided, sufficient exercise must be taken to maintain a healthy appetite and digestion, and abundant time devoted to rest and sleep. Beyond securing a plentiful supply of plain

and easily digestible food, with a judicious portion of meat, vegetables, and fruit, it is unnecessary to give special attention to the diet.

Should the secretion of milk be scanty, it may often be increased by the free use of animal broths, chocolate, gruel, or milk, and sometimes the employment of a good malt extract may be necessary. Such tonics as ferrated elixir of cinchona, bitter wine of iron, and the preparation known as "beef, wine and iron," are useful when there is anæmia, or when the general failure of strength cannot be overcome by food and attention to hygienic rules.

The ordinary local conditions indicating the necessity of premature weaning, on the mother's account, are fissures of the nipple, and mammary abscess.

Fissure being usually a unilateral condition, it is only necessary to retire the affected side from duty and nourish the child alternately from the unaffected gland and from the bottle until healing takes place, the disabled breast being pumped in the meantime to keep up secretory activity. Should both sides be affected, weaning may be imperative, on account of the extreme pain produced by sucking, although, even under these circumstances, an effort must be made to maintain the flow of milk by regular pumping. Sometimes women are able to

struggle through the attack by taking advantage of the relief and protection afforded by a nipple-shield.

Fissures of the nipple may be preceded by various diseases of the delicate skin of the part. They result, also, from want of cleanliness or from keeping the nipple too moist, as when constant sucking is allowed or when there is a continual flow of milk. They may be prevented by proper attention to the nipple before confinement. During the latter months of pregnancy the clothing covering the breast must be loose, and the wearing of a wire tea-strainer over the nipple to prevent pressure has been recommended by one authority. Each day, for three months before labor, the nipples should be washed thoroughly with hot water in the evening and anointed with cocoa-butter in the morning. At the same time, should the nipples be small or retracted, the woman must be taught to use her thumb and finger to draw them out. This process is not only an advantage in giving proper size and shape, but brings the skin into good condition without hardening it. The application of alcoholic and astringent lotions is not to be recommended. They tend to harden the tissue, which should be soft and pliable rather than tanned, and render the nipples liable to crack.

When a fissure exists, it is best first to see whether or not nursing can be continued by means of a

nipple-shield. Should the child refuse this, a good plan is to fill the shield with warm milk and invert it over the nipple. The infant then draws the fluid at once and without difficulty, and will often continue sucking until the breast milk follows. After nursing and removing the shield, the nipple must be dried thoroughly with absorbent cotton, and the following lotion applied with a camel's-hair brush:—

Take of—
Boracic acid.............20 grains.
Mucilage of acacia....... 1 fluidounce. Mix.

Mammary abscess requires careful surgical attention.

b. On the part of the infant, there are several indications for anticipating the time of withdrawing the mother's breast. It must be done if the occurrence of pregnancy or the recurrence of menstruation renders the milk unwholesome; if the mother contracts a dangerous contagious disease, as smallpox, scarlet fever, or erysipelas; if the mammary glands become inflamed; if the breast does not afford sufficient nourishment and artificial food be refused; and, finally, if dentition be markedly delayed and the premonitory symptoms of rickets appear. As to the amount of nourishment, it must be remembered that the breast milk may be of good quality, but so diminished in quantity that it is insufficient; or, while abundant in quantity, so poor

in quality that it does not meet the demands of nutrition. Even without a minute examination of the milk, it is possible to form a good idea of which condition is present from the behavior of the infant in the act of sucking. If the milk be good in quality but deficient in quantity, the babe, when put to the breast, seizes the nipple as if famished and draws upon it vigorously for a time, and then drops it with a scream of rage. On the contrary, should there be an abundant supply of poor milk, the nipple is grasped languidly, the child lies a long time at the breast and falls asleep there. Consideration of the final indication opens the question of the propriety of regulating weaning by the progress of dentition. This is certainly a good guide, but not in the way implied in the old precept, that the child must not be taken from the breast until evolution of the stomach and eye teeth. Insufficient food is one of the chief causes of rickets, and rickets more than any other disease delays dentition; consequently, should the teeth not pierce the gum in time, the inference is for other food rather than a continuance of the faulty maternal supply.

Upon deciding to anticipate the time of weaning, the next point to consider is whether the infant shall be brought up by hand or by a wet-nurse.

2. *Feeding by a wet-nurse.* The advantage of

feeding from the breast of a wet-nurse is that the mother's milk is substituted by the milk of another woman; in other words, that natural feeding is continued—a matter of moment in all cases, and of inestimable importance with delicate children. The disadvantage consists in the difficulty of finding, in a woman belonging to the class from which wet-nurses come, all the moral and physical characters essential to a good substitute, and the fact that a stranger is introduced into the household, often to deceive and annoy the family, and on the slightest provocation to leave her charge to fate or to the tender mercies of another of her kind. For these reasons it is preferable, in the majority of instances, to trust to careful bottle-feeding. Nevertheless, as some children must have human milk if their lives are to be saved, the rules for selecting a wet-nurse must be understood.

The woman chosen must be strong and robust, but rather spare than fat. Her bill of health must be perfectly free from hereditary tendency to mental or physical disease and from taint of syphilis or tuberculosis. She must be cheerful, good-natured, active, careful, and temperate in habits. Her age should be between twenty and thirty years; she should understand the care of an infant and the manner of giving suck; her child ought to be of nearly the same age as the infant to be adopted,

and she must be able to afford an abundant supply of good milk.

The last quality can be estimated by inspecting the breast, by examining some of the milk drawn by a pump, and by ascertaining the condition of the woman's own child. The breasts of a good nurse are not necessarily large, but are firm to the touch and pyriform in shape, with well developed, prominent nipples, and with the skin distinctly marbled with large blue veins. The milk, which ought to flow readily on pressure or on suction, should be opaque and dull white in color, have a specific gravity of 1.031, an alkaline reaction, and show, when placed under the microscope, a number of minute, equal-sized, fat globules. Its quantity may be ascertained by weighing the child before and after sucking, the normal gain being from three to six ounces. There is, however, no better or more readily applied test of the quality of a nurse than the size, weight, and general development of her own child; and if it be weak and ill-nourished, no amount of fitness in other respects can warrant her engagement.

Even when a woman is found fulfilling in her single person all the required conditions—a rare thing, indeed—it does not necessarily follow that her milk will suit the babe to be suckled. Then changes and new trials must be made until the desired end be attained.

The diet of a wet-nurse and the manner of weaning must be governed by the rules already given for maternal feeding.

Personally, I have had such good results from carefully regulated bottle feeding that I have, as far as possible, given up the employment of wet-nurses, preferring to regulate the artificial food myself rather than allow an ignorant woman to supplement surreptitiously her deficient supply of breast milk by an unskilfully proportioned food,—an event of not uncommon occurrence.

3. *Artificial feeding.*—In my experience there are few American women, especially in the well-to-do classes, who do not look upon the duty of nursing their babies as a pleasant one; but there are many who are completely unable to do so, and a vast number in whom the secretion of milk fails after a few weeks or months of lactation. They must, therefore, through no fault of their own, resort to a wet-nurse or to artificial feeding. Usually they select the last method, with results that vary in direct proportion to the care and intelligence displayed in carrying it out.

There is no artificial food equal to the milk of a robust woman. The fluid, however, secreted from the glands of a feeble or unhealthy mother, though often sufficient in quantity to fill the suckling's stomach and satisfy the cravings of hunger, does not

contain enough pabulum to meet the demands of nutrition. In such unfortunate cases, good cows' milk, properly prepared, is a better food than the bad breast milk. More care and trouble, though, are involved in bottle- than in breast-feeding. If the child has been nourished in the natural way—*i. e.*, breast-fed—even for a few weeks, or when the powers of digestion are inherently active, the task is far easier to accomplish. In these cases the stomach and intestinal canal, inactive in fœtal life, are trained to their new duties under normal conditions, and so prepared for the digestion of properly selected artificial food. On the contrary, if digestion be naturally feeble, or if the infant must be bottle-fed from the first, great difficulty may be expected, and most skilful handling is necessary.

To insure success in hand-feeding, it must be remembered that an infant is not nourished alone by the food he swallows, but by that portion of it he digests and assimilates. The best diet, therefore, is one so adapted to age and digestive power that everything eaten will be digested and absorbed. But as children differ as much in constitution as in feature, it is impossible to formulate exactly a food that will be applicable to every case, or one that needs no change from month to month of progressing growth. As age and strength increase, there is a corresponding development of the gastro-intes-

tinal functions and a demand for more and stronger food. On the other hand, should the system be accidentally reduced by disease, the digestion, sympathizing in the general debility, temporarily loses its normal activity and assumes that of an earlier age. In such a case more nourishment is certainly needed to build up the failing strength, but it is to be supplied by giving such food as can be completely assimilated, and not by forcing down strong food merely because it is *strong;* for the latter, when not vomited, passes through the bowels undigested, and the little creature starves to death in the midst of plenty, or dies from the ill effects of the constant presence of fermenting food in the alimentary canal. On these accounts many changes in diet, as to quality and quantity, must be anticipated and made.

Important matters, therefore, to be studied in detail are: *a*, the selection of a proper substitute for the breast milk; *b*, the quantity to be given; *c*, the method of preparation; *d*, the mode of administration; and, *e*, the means of preservation.

a. Healthy breast milk must be taken as the type of infant's food, and the nearer an artificial substance can be made to approach it in chemical composition and physical properties, the more perfect it is.

Normal breast milk has a specific gravity of 1.031.

It is a persistently alkaline fluid, having a somewhat animal, usually disagreeable, and very rarely sweetish taste. It is bluish-white in color, thin and watery in consistence, and contains no bacteria.

According to recent analyses, its average composition is:—

Fat,	4.00 per cent.
Milk sugar (lactose),	7.00 " "
Proteids,	1.50 " "
Salts,	0.20 " "
Water,	87.30 " "

Some authorities give a higher albuminoid average, namely, 2 per cent.; but, as will be detailed later, the proportion of this ingredient varies greatly, and it is safe to assert that a range from 1.00 to 2.25 per cent. is perfectly normal.

Human milk contains, then, fat, nitrogenous material, sugar, salts and water,—all the elements essential to repair tissue waste, to supply new material for growth, and to maintain body heat, or, in other words, to constitute a perfect aliment; and these, too, are so proportioned in the combination as to most easily and completely meet the demands.

It must not be supposed, however, that the elements are uniformly present in the same proportion. On the contrary, the fluid varies both at different periods of lactation and in different individuals.

This fact is the most striking feature of Professor Leeds' experimental work, which shows that the most changeable constituent is the proteids, vary-

ing from a maximum of 4.86 per cent. to a minimum of 0.85; the next are the fat and salts, the maximum being about three times the minimum, and the least the sugar. The latter, in fact, varies but little from a standard of about 7 per cent. The function of the proteid is nutritive, that of milk sugar calorifacient; hence, the point seems to be that nature, while allowing a wide range of oscillation in the rapidity of tissue building, carefully provides an available fuel for the constant maintenance of animal heat,—the supply of caloric due to cerebral impulses and self-originated locomotion being extremely small in early infancy.

In seeking a substitute for human milk, one naturally turns to the domestic animals for the source of supply. Between the milk of the ass, cow, goat and ewe there is little choice, so far as composition is concerned, although, perhaps, asses' milk resembles that of women a little more closely than the others; nevertheless, cows' milk is usually selected, because, being plentiful, it is easily obtained and cheap.

Cows' milk* (market milk) has a specific gravity

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* The character of cows' milk may be determined with sufficient accuracy in the following way:—

Provide a specific gravity glass, such as is shown in Fig 18, and which can be obtained at any chemist's, or a *lactometer* may be used. To obtain the specific gravity, fill a beaker to such a point with milk that it will float the specific gravity glass or

of 1.029, is richer looking, that is, whiter and more opaque than human milk, is slightly acid in reaction unless perfectly fresh from pasture-fed animals, when it may be neutral or alkaline, and always contains bacteria. It has the following average composition:—

Fat,	3.50 per cent.
Milk Sugar,	4.30 " "
Proteids,	4.00 " "
Salts,	0.70 " "
Water,	87.00 " "

Comparing this analysis with that previously given for human milk, it is readily seen that the two fluids differ in specific gravity and reaction, and

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lactometer, and read the degree of density from the scale at a level with the surface of the milk. The chemical reaction is found by inserting a piece of blue litmus paper, which should turn slightly red a few moments after being wet. In applying this test small pieces of litmus paper should be examined under and in the milk, as exposure to air may redden paper dipped in milk, although the fluid itself may not be acid. To ascertain the proportion of cream, cut a narrow strip of paper four inches long, and divide the upper half-inch, by cross-markings, into twelve equal parts; paste this on a beaker (Fig. 18) with the marked portion uppermost, and the lower edge coming accurately to the bottom of the beaker; then pour in enough milk to come just to the top of the paper, and place the whole aside for twenty-four hours. During this time the cream rises and appears as a yellow layer at the top; this layer should have the depth of ten or twelve spaces. Beakers with a scale cut in the glass are now sold in instrument shops under the name of "creamometers."

that cow's milk contains more nitrogenous material but less fat and much less sugar than woman's milk.

While the sugar of human and cows' milk is chemically identical, and the fats are quite similar, there are important differences in the quality as well as the quantity of the nitrogenous material. This in both fluids is complex, being made up of casein, lactalbumin, and peptones. The peptones are present in very small quantities only, and to what extent they exist naturally, and to what, in cows' milk, they are formed by bacterial action, is not known.

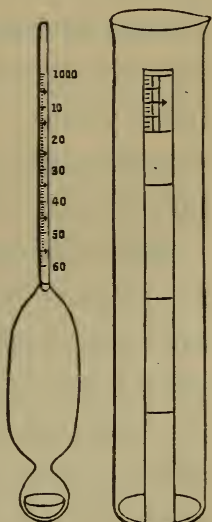

Fig. 18. — Specific Gravity Glass and Cream Beaker.

Casein is an acid substance, and is present in combination with an alkali, chiefly as potassium caseinate. The casein of cows' milk is readily precipitated by dilute acid, and is thrown down in large firm masses; that of human milk requires more acid and is precipitated in fine, soft particles, which are dissolved by an excess of acid. After the separation of the casein, the lactalbumin is left in solution in the whey. Lactalbumin closely resembles serum albumin, is unaffected by acid, but is precipitated by boiling.

The relative proportions of casein and lactalbumin have been determined with sufficient accuracy to point out the most important of all the differences between the two secretions, which is, that the fraction of the total albuminoids in cows' milk which is coagulable by acids (casein) is far greater (perhaps four times) than the non-coagulable part (lactalbumin). In woman's milk, on the contrary, the reverse is true, and the non-coagulable part much exceeds (perhaps by more than twice) the coagulable portion. Taking weight for weight of each secretion, the coagulum of human milk is only one-fifth that of cows' milk.

This difference is readily tested by adding rennet to the two fluids. In the case of cows' milk the casein is coagulated into large, firm masses, while with human milk a light, loose curd is formed. In the stomach the acid gastric juice has the same effect, producing in the first instance a coagulum most difficult to digest; in the other, one of vastly less bulk and readily attacked and broken down by the gastro-intestinal solvents.

These chemical and physical properties of cows' milk can be altered by various methods of preparation, and unless this be done there are few instances in which it will not prove a poor substitute for the natural food.

Condensed milk is frequently recommended by

physicians and largely used by the laity on their own responsibility. It keeps better than cows' milk and is supposed to be more readily digested by young infants. The latter supposition is a mistaken one, and arises from the overlooked fact that condensed milk is always given dissolved in a large proportion of water, while cows' milk is too frequently used insufficiently diluted or otherwise improperly prepared. The author is convinced of the accuracy of this statement from a number of years' close study of the subject.

Condensed milk contains a large proportion of sugar, forms fat quickly, and thus makes large babies; sugar also counteracts in some degree the tendency to constipation,—often a troublesome complaint in hand-feeding. These advantages are unquestioned, and, together with the ease of preparation and the fact that, when in good condition, it is sterile or free from bacteria, are those which place it so high in the esteem of monthly nurses. It is equally true, however, that prepared as a food it does not contain enough nutrient material, either in the form of fat or of proteids, to supply the wants of a growing baby.

Again, more than half of the saccharine ingredient of this preparation is cane sugar, added for the purpose of preservation, and this material is very liable, when in excess, to ferment in the ali-

mentary canal, giving rise to irritant products that impede digestion.

Infants fed upon condensed milk, though fat, are pale, lethargic and flabby; although large, are far from strong; have little power to resist diseases; often cut their teeth late, and are very likely to drift into rickets. It must be remembered also that condensed milk, when long kept, or when packed in imperfect cans, not unfrequently undergoes decomposition, and thus becomes utterly unfit for use.

For a temporary change of diet, and as a substitute during traveling or under circumstances in which sound cows' milk cannot be obtained, it may be resorted to with advantage. Again, for feeding very young infants when a sterile food of low albuminoid percentage is indicated, it may sometimes prove useful, but the necessity of adding fat, in the form of cream, must always be insisted upon.

The farinaceous substances so often selected, especially by the poor, to replace breast milk, are not only bad foods, but have both directly and indirectly a deleterious effect upon the processes of nutrition.

They are bad for two reasons. First, they differ materially in chemical composition from human milk. For example, in arrowroot, which is the favorite, the proportion of the tissue-building to the heat-producing element is as one to twenty, while

in human milk it is about one to five. Second, the heat-producing principle, starch, must be converted into sugar before it can be absorbed. This change is accomplished in the body by the saliva and pancreatic juice,—secretions that are not fully established until the fourth month.

While the starch lies undigested in the gastro-intestinal canal, it is subject to fermentation, resulting in the formation of irritant products that rapidly induce catarrh of the mucous membrane,—a condition directly interfering with the digestion and absorption of food. Again, perfect nutrition demands rapid waste and removal of effete tissues as well as repair of the same. This is effected by oxidation. Now, sugars are known to have a much greater affinity for oxygen than albuminates, and when the diet consists of farinaceous material, the small amount of sugar formed and absorbed appropriates oxygen that otherwise would go toward the removal of waste, and so retards the necessary changes. The persistent and exclusive use of this class of food always leads to a condition of malnutrition which may result in simple atrophy, scurvy or rickets, while the irritant products of fermentation often produce sufficient gastro-intestinal disturbance to cause death.

Farinaceous food, as such, is therefore never permissible before the later months of infancy, and

then only as an adjunct to properly modified milk mixtures. It may be employed earlier for its mechanical action, with milk mixtures, and in properly selected cases proves very useful in this way. The purpose of this method of employment will be considered later under the head of *Attenuants.*

The nutrient value of the cereals and their products, as they exist in so-called "infants' foods," has been imperfectly determined. They are undoubtedly useful as mechanical attenuants, but it is very certain that none of them, unless prepared with milk, can permanently meet the demand of nutrition. At the same time it is quite probable that the albuminoids with the soluble carbohydrates (maltose) obtained by Liebig's process have a food value of their own, making them more serviceable than the starches.

b. The quantity of food to be allowed each day varies with the appetite and age. Some infants habitually eat little, others much; as both thrive, the question of the correct amount in a given case must be answered by observation. So long as the child develops with normal rapidity and keeps well he may be allowed to eat as much or as little as he wants; for, if food of proper strength be given at proper intervals, the instinctive cravings of hunger, since they represent the wants of the system, rarely

lead to excess in either direction. Nevertheless, it is well to have some guide.

During the first four weeks, infants generally require from twelve to seventeen fluidounces of food; in the second and third months, about thirty fluidounces, and from this time to the twelfth month from two to two and one-half or even three pints. After the twelfth month the quantity depends upon whether additions be made to the diet, or milk food be used exclusively. When the daily amount reaches three pints, the limit of the capacity of the stomach is usually attained, and the greater demand for nutriment, as growth advances month by month, must be met by adding to the strength of the food rather than by increasing its bulk. These two factors, strength and quantity, are intimately associated throughout the whole period of infancy, and in the earlier months a mere increase in the latter is not always sufficient to maintain the balance of nutrition.

As a rule, infants are overfed, and this opens the very interesting question of the normal capacity of the stomach at different ages. Rotch states that, by actual measurement, the stomach of an infant five days old holds 25 c.c., or six and one-quarter fluidrachms, a quantity very far short of that usually forced upon the babe during the first week. Frowlowsky's investigations show that there is a very

rapid increase in the capacity of the stomach during the first two months of life, while in the third, fourth and fifth months the increase is slight. Guided by these data, the quantity of food should be rapidly augmented during the first six or eight weeks of life and then held at the same quantity up to the fifth or sixth month. Another considerable increase is also demanded between the sixth and the tenth months.

The author has been unable to verify the above measurements, and has, on the contrary, found no uniformity in the size of the stomach for given ages; still clinical experience is a sufficient guide, and upon this the following table is based:—

TABLE OF INTERVALS OF FEEDING AND AVERAGE AMOUNTS OF FOOD.

Age.	Intervals of Feeding.	Average Amount at Each Feeding.	Average Amount in 24 Hours.
During first week,	2 hours.	1 ounce.	12 ounces.
From second to sixth week,	2 hours.	1½ to 2 ounces.	12 to 17 ounces.
From sixth week to third month,	2 hours.	3 to 4 ounces.	24 to 30 ounces.
From third to sixth month,	2½ hours.	4 to 6 ounces.	32 to 36 ounces.
At ten months,	3 hours.	8 ounces.	40 ounces.

c. The object to be accomplished in the preparation or *modification* of cows' milk is to make it re-

semble human milk as much as possible in chemical composition and physical properties. To do this it is necessary to reduce the proportion of proteids, to increase the proportion of fat and sugar, and to overcome the tendency of the casein to coagulate into large, firm masses upon entering the stomach and coming in contact with the acid gastric juice.

Dilution with water is all that need be done to reduce the amount of proteids to the proper level; but as this diminishes the already insufficient fat and sugar, it is essential to add these materials to the mixture of milk and water. Fat is best added in the form of *gravity* cream which contains approximately 16 per cent. of fat; and of the sugars, either pure white loaf sugar or sugar of milk may be used. The latter is greatly preferable, because it is the natural sugar, is directly assimilable, in the process of digestion is converted into lactic acid, and, unlike cane sugar, is not readily fermented.

Firm clotting may be prevented by the addition of an alkali or a small quantity of some thickening substance or attenuant.

Lime-water is the alkali usually selected. It neutralizes the slightly acid reaction which usually characterizes market milk and has a further chemical action which is variously explained. Some authorities claim that to the extent of the quantity of lime-water added a soluble calcium caseinate is

formed which is not acted upon by the acid gastric juice with the precipitation of fine curds. Others, that lime-water causes the mucoid proteids (Storch) of the milk to swell up and become viscid, thus tending to gelatinize the curd, and by its alkaline properties to retard the curdling action of the gastric secretion. Whichever theory is accepted the result is the same, the total bulk of casein coagulum is diminished and the ease of digestion increased. To produce measurable results the quantity of lime-water to be used must always be in the proportion of one part to twenty of milk mixture. When lime-water is constantly employed, it becomes quite an item of expense if procured from the chemist's. This outlay is unnecessary, for it can be made quite as well in the nursery. Take a piece of unslaked lime as large as a walnut, place in an open vessel, pour over it a quart of water and slake it thoroughly; pour off this water, as it contains certain soluble impurities; stir up the slaked lime with a second quart of water, allow it to settle, and again pour away. Next place the pure lime in a two-quart, wide-mouthed, earthen vessel and fill with boiled and filtered water, stir thoroughly, allow it to settle, and use only from the top, replacing the water and stirring as consumed.

Instead of lime-water, bicarbonate of sodium may be added to each bottle in the proportion of one

grain to each fluidounce of milk mixture; or, better still, from five to fifteen drops of the saccharated solution of lime. This solution is made in the following way:—

Take of—

Slaked lime	1 ounce.
Refined sugar, in powder	2 ounces.
Distilled water	1 pint.

Mix the lime and sugar by trituration in a mortar. Transfer the mixture to a bottle containing the water, and having closed this with a cork, shake it occasionally for a few hours. Finally, separate the clear solution with a siphon and keep it in a stoppered bottle.

Thickening substances, *attenuants*, are employed to act in the main mechanically by getting, as it were, between the particles of casein during coagulation, preventing their running together and forming a large compact mass. This class embraces gummy materials like dextrin, gelatin, the various infants' foods prepared by Liebig's process (in which the starch of wheat and barley is converted into maltose and dextrin), and *finely divided* starch as it exists in barley- or oatmeal-water; and it is for this purpose only that starch is permissible as an element of diet in infancy. Barley-water and gelatin* are the attenuants usually employed.

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* See Chapter IX.

When an "infant's food" is used to act mechanically, care should be taken to select a reliable one, that is, one in which the starch has been converted into maltose and dextrin by the process of manufacture. The articles known as Mellin's Food and Horlick's Food can be relied upon. One teaspoonful of either dissolved in a tablespoonful of hot water and added to each portion of food, makes a very easily digested mixture. Dry malt extracts also act well mechanically, being especially useful when desirable to reinforce the fat-building elements of the food.

It must not be inferred from what has been stated in regard to the use of lime-water and attenuants that these are essentials in the artificial feeding of infants. On the contrary, the majority of healthy babies require only sound cows' milk, properly modified by the addition of cream, milk sugar, and water. It is best to leave the addition of lime-water, bicarbonate of sodium, or an attenuant, to the judgment of the physician.

For the successful management of children, the mother or nurse must not only be familiar with the theory of feeding, but must practically understand the methods of preparing food. To this end a schedule of the diet of an infant from birth upward, with a sketch of the modifications that have to be made most frequently, will serve as a useful guide.

Diet during the first week:—

Gravity cream (16%)......2 teaspoonfuls.
Whey...................3 teaspoonfuls.
Water (hot)...............3 teaspoonfuls.
Milk sugar................ $\frac{1}{3}$ teaspoonful.

For each portion; to be given every two hours from 5 A.M. to 11 P.M., and in some cases once or twice at night; amounting to twelve fluidounces of food per diem.

Diet from the second to the sixth week:—

Gravity cream (16%) ......2 teaspoonfuls (fld. oz. $\frac{1}{4}$).
Milk.....................1 tablespoonful (" " $\frac{1}{2}$).
Milk sugar................ $\frac{1}{3}$ teaspoonful.
Water....................2 tablespoonfuls (" " 1).

For one portion; to be given every two hours from 5 A.M. to 11 P.M.; amounting to seventeen fluidounces of food per diem.

Diet from the sixth week to the end of the second month:—

Gravity cream (16%)......1 tablespoonful (fld. oz. $\frac{1}{2}$).
Milk....................$2\frac{1}{2}$ tablespoonfuls (" " $1\frac{1}{4}$).
Milk sugar................ $\frac{1}{2}$ teaspoonful.
Water...................$2\frac{1}{2}$ tablespoonfuls (" " $1\frac{1}{4}$).

For each portion; to be given every two hours; amounting to thirty fluidounces per diem.

Diet from the beginning of the third month to the sixth month:—

Gravity cream (16%)......1 tablespoonful (fld. oz. $\frac{1}{2}$).
Milk.....................4 tablespoonfuls (" " 2).
Milk sugar................1 teaspoonful.
Water ....3 tablespoonfuls (" " $1\frac{1}{2}$).

For each portion; to be given every two and one-half hours; thirty-two fluidounces per diem.

Diet during the sixth and seventh months; six meals daily:—

Gravity cream (16%)......	1 tablespoonful (fld. oz. ½).
Milk......................	7 tablespoonfuls (" " 3½).
Milk sugar................	1 teaspoonful.
Water.....................	4 tablespoonfuls (" " 2).

For each portion; to be given every three hours from 6 or 7 A.M. to 9 or 10 P.M.; thirty-six fluidounces per diem.

Often a pinch—gr. 2 to 5—of table salt is of service, and may be added, after the second week, to each portion of food.

A table of the dietary, as far as it has been carried, may be useful for convenience of reference (page 175).

Throughout the eighth and ninth months five meals a day will be sufficient, each meal composed of—

Gravity cream (16%)......	1 tablespoonful (fld. oz. ½).
Milk......................	12 tablespoonfuls (" " 6).
Milk sugar................	1 teaspoonful.
Water.....................	3 tablespoonfuls (" " 1½).

This allows forty fluidounces of food per diem.

At this age it is sometimes advisable to supplement the milk mixture with one of the reliable infants' foods (Liebig foods); thus, two teaspoonfuls of Mellin's food may be added to the second, third, and fourth meals, the milk sugar being then omitted. Instead of Liebig food, one of the wheat or barley flours prepared by baking or by diastase digestion

TABLE OF INGREDIENTS, HOURS AND INTERVALS OF FEEDING, AND TOTAL QUANTITY OF FOOD FOR A HEALTHY ARTIFICIALLY FED INFANT FROM BIRTH TO THE END OF THE SEVENTH MONTH.

AGE.	CREAM.	WHEY.	MILK.	MILK SUGAR.	SALT.	WATER.	HOURS FOR FEEDING.	INTERVALS OF FEEDING.	TOTAL QUANTITY.
During first week.	*fʒij.	fʒiij.	....	‡gr.xx.	....	fʒiij.	5 A.M. to 11 P.M.; sometimes 1 A.M. and 3 A.M.	2 hours.	f℥xij.
From second to sixth week.	fʒij.	......	f℥ss.	gr. xx.	a pinch.	f℥j.	5 A.M. to 11 P.M.	2 hours.	f℥xvij.
From sixth week to end of second month.	†f℥ss.	......	fʒx.	ʒss.	a pinch.	fʒx.	5 A.M. to 11 P.M.	2 hours.	f℥xxx.
From third to sixth month	f℥ss.	......	f℥ij.	¶ʒj.	a pinch.	f℥iss.	5 A.M. to 10.30 P.M.	2½ hours.	f℥xxxij.
During sixth and seventh months.	f℥ss.	......	f℥iiss.	ʒj.	a pinch.	f℥ij.	7 A.M. to 10 P.M.	3 hours.	f℥xxxvj.

*fʒ = Fluidrachm or 1 teaspoonful. †f℥ = Fluidounce or 2 tablespoonfuls. ‡ gr. xx = about one-third level teaspoonful. ¶ ʒi = one level teaspoonful.

may be used. Baking at a temperature of 300° to 400° converts the starch into dextrin; treatment with diastase produces maltose and dextrin. The best examples of the baked flours are Blair's Wheat Flour, Imperial Granum, and Robinson's Barley. In selecting a Liebig food or baked flour as an adjuvant, one must be influenced by the condition of the infant to be fed. A baked flour is indicated when there is a tendency to too frequent and liquid fæcal evacuations, as it has a somewhat astringent action, and is to be avoided in cases of sluggish bowels and constipation. Under the latter conditions a Liebig food—Mellin's, for instance—should be used, as a laxative action is desirable.

Diet from the tenth to the fourteenth month, five meals daily:—

Gravity cream (16%)......	1 tablespoonful	(fld. oz. ½).
Milk......................	15 tablespoonfuls	(" " 7½).
Milk sugar................	1 tablespoonful	(" " ½).
(Or flour-ball or barley jelly*	2 teaspoonfuls.)	
Water.....................	3 tablespoonfuls	(" " 1½).

In using flour-ball, rub one teaspoonful of the powder with a tablespoonful of milk into a smooth paste, then add a second tablespoonful of milk, constantly rubbing until a cream-like mixture is obtained; finally, stir into the mixture of cream, milk, milk sugar and water.

Occasionally, about the end of the first year, a

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* See Chapter IX.

child may require a more varied and substantial diet; for example:—

First meal, 7 A.M.—Milk mixture as above.

Second meal, 10.30 A.M.—A breakfast-cupful of warm milk (eight fluidounces).

Third meal, 2 P.M.—The yolk of an egg lightly boiled, with stale bread crumbs.

Fourth meal, 6 P.M.—Same as first.

Fifth meal, 10 P.M.—Same as second.

On alternate days the third meal may consist of a teacupful (six fluidounces) of beef-, mutton-, or chicken-broth, containing a few stale bread crumbs.

Diet from the fourteenth to eighteenth month, five meals a day:—

First meal, 7 A.M.—A slice of stale bread, broken and soaked in a breakfast-cupful (eight fluidounces) of milk; or two tablespoonfuls of well-cooked and strained porridge (oatmeal or cracked wheat), with two tablespoonfuls of cream and a little salt (no sugar); a breakfast-cupful of new milk.

Second meal, 10 A.M.—A teacupful of milk (six fluidounces) with a soda biscuit or thin slice of lightly buttered bread.

Third meal, 2 P.M.—A teacupful (six fluidounces) of beef-, chicken-, or mutton-broth, with a slice of bread; one good tablespoonful of rice-and-milk pudding.

Fourth meal, 6 P.M.—Bread and milk, strained porridge and cream, with milk, as at first meal.

Fifth meal, 10 P.M.—A breakfast-cupful of milk with or without one tablespoonful of a good Liebig food.

To alternate with this:—

First meal, 7 A.M.—The yolk of an egg lightly boiled, with bread crumbs; a teacupful of milk.

Second meal, 10 A.M.—A teacupful of milk with a thin slice of lightly buttered bread.

Third meal, 2 P.M.—A mashed baked potato, moistened with four tablespoonfuls of meat broth; two good tablespoonfuls of junket, with the same quantity of cream.

Fourth meal, 6 P.M.—A breakfast-cupful of milk with a slice of bread broken up and soaked in it.

Fifth meal, 10 P.M.—A teacupful of milk.

The fifth meal is often unnecessary, and sleep should never be disturbed for it. Should the child awake at 5 or 6 A.M. he should have a cup of warm milk, and not be allowed to go hungry until the set breakfast hour.

Diet from eighteen months to the end of two and one-half years, four meals a day:—

First meal, 7 A.M.—A breakfast-cupful of milk; the yolk of a lightly boiled egg, with a little butter and salt; two thin slices of bread and butter.

Second meal, 11 A.M.—A teacupful of milk with a plain biscuit or slice of bread.

Third meal, 2 P.M.—A breakfast-cupful of beef-, mutton-, or chicken-broth; a thin slice of stale bread; a saucer of rice-and-milk pudding.

Fourth meal, 6.30 P.M.—A breakfast-cupful of milk, with bread and butter.

On alternate days:—

First meal, 7 A.M.—Two tablespoonfuls of thoroughly cooked oatmeal or wheaten grits, with two tablespoonfuls of cream and a little salt (no sugar); a teacupful of milk.

Second meal, 11 A.M.—A teacupful of milk with a slice of bread and butter.

Third meal, 2 P.M.—One tablespoonful of underdone mutton pounded to a paste; bread and butter, or mashed baked potato, moistened with good, plain dish gravy; a saucer of junket and cream.

Fourth meal, 6.30 P.M.—A breakfast-cupful of milk, a slice of soft milk toast, or a slice or two of bread and butter.

Diet from two and one-half to three and one-half years, four meals daily:—

First meal, 7.30 A.M.—One or two tumblerfuls of milk; a saucer of thoroughly cooked oatmeal or wheaten grits with cream and salt, and one or two slices of bread (one day old) and butter.

Second meal, 11 A.M. (if hungry).—A tumblerful of milk, or a teacupful of meat-broth, with a biscuit.

Third meal, 2 P.M.—A slice of underdone roast beef or mutton, or a bit of roast chicken or turkey, minced as fine as possible; a baked potato thoroughly mashed with a fork and moistened with gravy; a slice or two of bread and butter; a saucer of junket or rice-and-milk pudding.

Instead of the potato, well-boiled rice or plainly dressed macaroni may be allowed for variety, or one well-cooked green vegetable—*i. e.*, spinach, celery, young onions, cauliflower, and young peas mashed with a fork.

Fourth meal, 7 P.M.—A tumblerful of milk; one or two slices of bread and butter or of well-moistened milk-toast; a baked apple, or stewed prunes, or apples.

An important point, often neglected, is the matter of drink. Even the youngest infant requires water several times daily, and the demand increases with age. The water must be as pure as possible and should not be too cold. In the heat of summer, however, water moderately cooled by ice may be allowed without harm.

The foregoing schedule must, of course, be regarded *as an average*. Many children can bear nothing but milk food up to the age of two or even three years, and, provided enough be taken, no

fear for their nutrition need be entertained. If a child be thriving on milk, he is never to be forced to take additional food merely because a certain age has been reached; let the healthy appetite be the guide.

A young mother, in her solicitude to do her best, often finds great difficulty in adhering to simple rules in the diet of her child. Mrs. A., who has had great experience with children, having had some herself, tells her that the child would thrive far better if it ate such and such a thing, and did not keep to weak milk foods. Miss B. assures her that her cousin's last child grew much healthier after eating a chop with vegetables and pudding each day. Aunt C. comes with the announcement—which she breaks gently—that she knows the child is simply starving, and the ignorant nurse confirms the statement.

All their seemingly convincing theories are very upsetting to a mother who wants only to do what is right. She must bear in mind, however, that some children can eat anything and live; but she does not know how much better, more robust, and disease-resisting they would be, did they adhere to a simple diet. Let her remember that the so-called "weak milk foods" contain those nourishing qualities to which nature, in her wisdom, has limited the child's powers of digestion. Therefore, young mothers, let well enough alone.

Much more difficulty is experienced in feeding infants during the first twelve months than during the second. It will be well, therefore, to consider what would best be done in case the suggested milk modifications should disagree.

If, after feeding, vomiting occur, with the expulsion of large, firm clots of casein, the effect of adding lime-water or barley-water must be tried.

For instance, at the age of six weeks, make each bottle of—

Gravity cream (16%)......	1 tablespoonful	(fld. oz. ½).
Milk.....................	2 tablespoonfuls	(" " 1).
Milk sugar	½ teaspoonful.	
Lime-water...............	1 tablespoonful	(" " ½).
Water....................	2 tablespoonfuls	(" " 1).

Or of—

Gravity cream (16%)......	1 tablespoonful	(fld. oz. ½).
Milk.....................	2 tablespoonfuls	(" " 1).
Milk sugar................	½ teaspoonful.	
Barley-water..............	3 tablespoonfuls	(" " 1½).

Sometimes, particularly if there be diarrhœa, boiling makes the milk more tolerable, and in this condition it may be used instead of fresh milk in either of the above mixtures. Condensed milk, too, can be employed temporarily, making each portion of—

Gravity cream (16%)......	1 tablespoonful	(fld. oz. ½).
Condensed milk...........	1 teaspoonful.	
Hot water........	5 tablespoonfuls	(" " 2½).

Another good food is that recommended by Dr. A. V. Meigs. It consists of a combination of two parts of the cream, containing from fourteen to sixteen per cent. of fat; one part average milk; two parts lime-water, and three parts sugar-water, the latter consisting of seventeen and three-fourths drachms (about eighteen teaspoonfuls) of milk sugar to one pint of water. This makes an alkaline mixture with the percentage of its ingredients closely corresponding to human milk.

Whey* combined with cream and barley-water is more readily retained and digested than any of the above combinations, and may be usefully employed whenever curds are expelled by vomiting or diarrhœa; provided that in the latter condition there is not sufficient decomposition of the intestinal contents to require a no-milk diet. Whey contains a small amount of fat, the soluble proteids (lactalbumin), the sugar and part of the salts of milk. On the other hand, casein is practically absent, being clotted by the rennet and separated in the process of preparation. Knowing its composition one can easily appreciate its value, especially when combined with cream in cases where casein is digested with difficulty. Of course, the food value of whey is much less than that of the cows' milk from which

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* See Chapter IX.

it is made, but as a temporary substitute in acute indigestion and as an initial food in cases of inherently deficient casein digestion, its usefulness cannot be questioned. A good whey mixture for an infant of six weeks is—

Gravity cream (16%)...	2–4 teaspoonfuls	(fld. oz. $\frac{1}{4}$–$\frac{1}{2}$).
Whey....................	3 tablespoonfuls	(" " $1\frac{1}{2}$).
Milk sugar................	$\frac{1}{2}$ teaspoonful.	
Barley-water..............	3 tablespoonfuls	(" " $1\frac{1}{2}$).

For older children it is sufficient to double the cream and sugar and increase the whey and barley-water in equal quantities to make a five- or six-ounce bottle. With this food, too, it is easy to return to or institute milk feeding by substituting each day a small measured quantity of cow's milk for an equal measure of whey until the proper porportion of milk for the patient's age is attained, and the whey is supplanted or discarded.

Under the same conditions that whey mixtures are employed the process known as *predigestion* frequently gives most gratifying results.

Predigestion, or peptonization,* is best accomplished by means of the substance called *pancreatin*. That manufactured under the name of *extractum pancreatis* by Fairchild Brothers & Foster, of New York, has proved most efficient in my hands.

It is sometimes necessary to carry the artificial process almost or quite to complete digestion of the

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* The subject of peptonization is further considered in Chapter IX.

casein; more frequently partial predigestion is sufficient.

For the first, put into a clean quart bottle five grains of extractum pancreatis and fifteen grains of bicarbonate of sodium (the contents of a "peptonizing tube"), with four fluidounces of cool, filtered water; shake thoroughly together, and add a pint of fresh, cool milk. Place the bottle in water, not so hot but that the whole hand can be held in it for a minute without discomfort, and keep the bottle there for exactly thirty minutes. At the end of that time put the bottle on ice to check further digestion and to keep the milk from spoiling. The fluid obtained, while somewhat less white in color than milk, does not differ from it in taste; if however, an acid be added, the casein, instead of being coagulated into large firm curds, takes the form of minute, soft flakes, or readily broken down, feathery masses of small size. When the process is carried just to the point described, the casein is only partly converted into peptone; but every succeeding moment of continued warmth lessens the amount of casein until peptonization is complete. Then the liquid is grayish-yellow in color; has a distinctly bitter taste, and shows no coagulation whatever on the addition of an acid. This artificial digestion, therefore, may be carried just as far as circumstances indicate, although it is ordinarily best to stop it short of complete con-

version, as children object to the markedly bitter taste, and often, on account of it, absolutely refuse the food. Partial peptonization, too, is usually sufficient to adapt the milk to ready assimilation. To seize the proper moment for arresting the process, the person conducting it must be told to taste the milk from time to time, and, as soon as the least bitterness is appreciable, remove the bottle from the hot water and place it upon ice for cooling and use. Such milk may be sweetened with sugar of milk, and given pure or diluted with water. For an infant of six weeks each meal may consist of—

Peptonized milk............	4	tablespoonfuls (fld. oz. 2).
Milk sugar.................	½	teaspoonful.
Water......................	2	tablespoonfuls (" " 1).

To this, cream may be added when desirable, and by diminishing the quantity of water and increasing that of milk the strength of the food may be made greater at any time.

Although every precaution be taken, the last of a quantity of predigested food is very apt to grow bitter; and if the attendants will take the trouble, it is much better to peptonize every meal separately. This is readily done by obtaining a number of powders of pancreatin and bicarbonate of sodium, so proportioned that each packet shall contain the proper amount for one bottle of food. For example:

Take of—

Extractum pancreatis...... 9 grains.
Bicarbonate of sodium.....24 "

Mix and divide into twelve powders, and dispense in waxed papers.

DIRECTIONS.—Put one powder into a nursing bottle with two fluidounces of filtered water and two fluidounces of fresh sweet milk; shake together and keep warm in a water-bath for about half an hour before feeding; sweeten with half a teaspoonful of milk sugar.

Partial predigestion is the most useful and most uniformly applicable of all the methods of modifying cows' milk for infants having feeble digestive powers. For this purpose I have, for many years, employed the material known as Fairchild's peptogenic milk powder. This powder contains a digestive ferment, pancreatin; an alkali, bicarbonate of sodium, and a due proportion of milk sugar. It is in no sense an infants' food, and as considerable heat (115° F.) is required to insure its action, the food prepared by it is not only partially predigested, but also, to a certain extent, Pasteurized, a result greatly to be desired under certain conditions, as will be detailed later. The mode of employment is as follows:

Take of—

Gravity cream (16%)......1 tablespoonful (fld. oz. ½).
Milk.....................4 tablespoonfuls (" " 2).
Water....................4 tablespoonfuls (" " 2).
Peptogenic milk powder....1 level teaspoonful.*

* Measure provided with jar only to be used when preparing, at once, the whole quantity of food to be given in a day.

This mixture is heated over a brisk flame to 115° F., kept at this heat, with constant stirring, for six minutes, and then quickly cooled to the proper temperature (98° F.) for administration. The stirring is best done with a food thermometer, as this gives a constant record of the temperature, and the vessel containing the mixture must be moved away from or nearer to the source of heat as the temperature rises above or falls below the required point. In preparing each bottle separately—by far the better plan—the mixture should never be heated to the boiling point, as this checks the action of the pancreatin, and all digestive action after ingestion is lost. On the other hand, when the whole supply for a day is prepared at once, the required bulk of powder for the quantity of milk mixture is added, and the whole is heated slowly to boiling, ten minutes being occupied, and then quickly cooled. Here the object is to stop the digestion, so that the portion to be used later in the day may not be fully peptonized and bitter. This method has the advantage of effecting more perfect Pasteurization. When properly prepared, the resultant so-called "humanized milk" presents the casein in a minutely coagulable and digestible form; has an alkaline reaction; contains the proper proportion of salts, milk sugar, and fat; is not bitter in taste; has the appearance of human milk, and by Leeds's analysis shows:

Water,	86.2	per cent.
Fat,	4.5	"
Milk sugar,	7.	"
Albuminoids,	2.	"
Ash (salts),	0.3	"

This corresponds very closely with this observer's average analysis of human milk.

The great advantages of partial peptonization are that the necessity for lime-water, barley-water, and thickening substances to keep apart the curd is done away with, and that, when the digestive disturbance requiring a careful preparation of food is removed, an ordinary milk diet can be gradually resumed by regularly diminishing the time artificial digestion is allowed to progress. This changes the casein in a less and less degree, until finally it is taken in its natural form.

Sometimes milk, in every form and however carefully prepared, ferments soon after being swallowed and excites vomiting, or causes great flatulence and discomfort, while it affords little nourishment. With these cases the best plan is to withhold milk entirely for a time and try some other form of food. The following are good substitutes for an infant from three to six months old:

1. Albumin-water *........6–8 tablespoonfuls (fld. oz. 3–4). For one portion, to be given every two hours.

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* See Chapter IX.

2. Barley-water............6–8 tablespoonfuls (fld. oz. 3–4).
   Milk sugar............½ teaspoonful.

For one portion, to be given every two hours.

3. Barley-jelly............1 teaspoonful.
   Water................8 tablespoonfuls (fld. oz. 4).
   Mix and add half the white of a fresh egg.

For one portion, to be given every two hours.

4. Veal-broth* (½ lb. of meat to a pint of water),
   Barley-water... of each, 4 tablespoonfuls (fld. oz. 2).

For one portion, to be given every two hours.

5. Raw-beef juice*.........1–2 teaspoonfuls.

Every two hours.

While on No. 5 the patient must take from 12 to 24 fluidounces of pure water, barley-water, or white-of-egg- (albumin-) water each twenty-four hours. These must be given in small doses at short intervals.

Such foods are only to be used temporarily until the tendency to fermentation within the alimentary canal ceases; then milk may be gradually and cautiously resumed.

When infants who have passed the first year become affected with indigestion, it is often sufficient to reduce the strength of the food to a point compatible with digestive powers. For instance, at fourteen months the food may be reduced to that proper for a healthy child of eight months, or even

* See Chapter IX.

less. At this more advanced age, too, predigestion of the food is very serviceable.

If a few grains of extractum pancreatis be added to a goblet of thick, well-boiled starch-gruel, at a temperature of 100° F., the gelatinous mucilage quickly grows thinner and is soon transformed into a fluid, the starch having been rendered soluble by the action of the pancreatin; by still longer contact, the hydrated starch is converted into dextrin and sugar. Advantage may be taken of this property to render the foods containing starch assimilable. Thus, to a mixture of barley-jelly and milk, *e. g.*:—

Barley-jelly................	2 teaspoonfuls.
Milk sugar.................	1 teaspoonful.
Warm milk................	16 tablespoonfuls (fld. oz. 8).

Add three grains of extractum pancreatis, and five grains of bicarbonate of sodium, and keep warm for half an hour before administering.

The same process may be employed with food containing oatmeal, arrowroot or wheat flour, with a view of converting the starchy ingredients into digestible elements without materially altering the taste.

When the infant has arrived at an age to take meat broths, these too, when digestion is enfeebled, may be readily peptonized.*

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* See Chapter IX.

d. Success in hand feeding depends upon proper administration as well as careful preparation of the food.

From birth up to such time as broth, bread, and

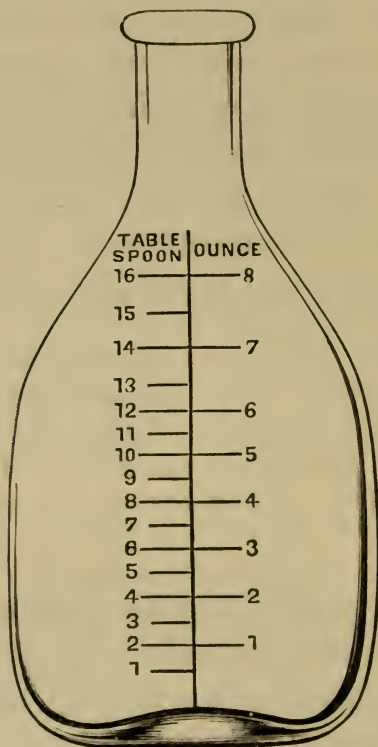

FIG. 19.—GRADUATED NURSING BOTTLE.

eggs are added to the diet, all the food should be taken from a bottle. Even after this, as the bottle is a comfort and insures slow feeding, it may be allowed for milk preparations until the child of

his own accord tires of it. The only feeding apparatus to be admitted to the nursery is the simple bottle and tip. All complicated arrangements of rubber and glass tubing are not only an abomination, but a fruitful source of sickness and death. Rather than use them, it is far better to feed the infant with a spoon. The graduated nursing bottle (Fig. 19), first suggested by myself, is a useful implement. Its interior surface is so shaped as to present no angles for the collection of milk; it is easily cleaned, and the graduated scale is convenient for nursery use. It is made of transparent flint glass, so that the slightest foulness can be detected at a glance, and varies in capacity from six to twelve fluidounces. Two should be on hand at a time, to be used alternately. Immediately after a meal the bottle must be thoroughly washed out with scalding water, filled with a solution of bicarbonate of sodium—one teaspoonful to a pint of water—and thus allowed to stand until next required; then the soda solution being emptied, it must be thoroughly rinsed with cold water before receiving the food. The tips or nipples, of which there should also be two, must be composed of soft, flexible India-rubber, and a conical shape is to be preferred, as being more readily everted and cleaned; the open-

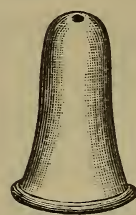

Fig. 20.
Bottle Tip.

ing at the point must be free, but not large enough to permit the milk to flow in a stream without suction. At the end of each feeding the nipple must be removed at once from the bottle, cleansed externally by rubbing with a stiff brush wet with warm water and borax, everted and treated in the same way, and then placed in cold water and allowed to stand in a cool place until again wanted.

While taking these precautions for perfect cleanliness, the nurse must satisfy herself of their efficacy by smelling both the bottle and the tip just before they are used, to be sure of the absence of any sour odor.

Next to cleanliness of the feeding apparatus, it is important to insist upon the separate preparation of each meal immediately before it is to be given. The practice of making, in the morning, the whole day's supply of food, although it saves trouble, is a most dangerous one. Unless subjected to Pasteurization or sterilization changes almost invariably take place in the mixture, and by the close of the day it becomes unfit for consumption.

When the graduated bottle is not at hand, a common glass graduate, marked for fluidrachms and ounces and holding a pint, should be provided for the nursery. Some minutes before meal-time, so as to avoid hurry, measure the different fluid ingredients of the food in this, one after the other;

add the requisite quantity of milk sugar, and mix the whole thoroughly, by stirring with a spoon, and pour into the feeding bottle. When the graduated bottle is employed, thorough shaking is sufficient. The food must now be heated to a temperature of about 95° F. This can be done by steeping the bottle in hot water, or by placing it in a water-bath over an alcohol lamp or gas jet. Finally, apply the tip and the meal is ready.

When feeding, the child must occupy a half-reclining position in the nurse's lap. The bottle should be held by the nurse, at first horizontally, but gradually more and more tilted up as it is emptied, the object being to keep the neck always full and prevent the drawing in and swallowing of air. Ample time, say five, ten or fifteen minutes, according to the quantity of food, should be allowed for the meal. It is best to withdraw the bottle occasionally for a brief rest, and after the meal is over, sucking from the empty bottle must not be allowed even for a moment.

e. For children residing in cities, an honest dairyman must be found who will serve sound milk and cream from country cows once every day in winter, and twice during the day in the heat of summer. The farm should be so situated that the consumer may be served not later than twelve hours after milking. The milk of ordinary stock is more

suitable than that from Alderney, Durham, or fancy-bred cows, as in these the fat percentage is either too low or too high, varying from 2.88 to 5.21 per cent. The mixed milk of a good herd is to be preferred to that from a single animal. It is less likely to be affected by peculiarities of feeding, and less liable to variation from alterations in health or different stages of lactation.

The care of the herd and of the milk is of great consequence. The cows should be subjected to the tuberculin test, their condition of health should be guaranteed by careful and regular inspection by a competent veterinarian, and the milk of any animal failing to pass should not be mixed with that from healthy animals. The cows must not be fed upon swill or the refuse of breweries, glucose factories, or any other fermented food. They must not be allowed to drink stagnant water, and must not be heated or worried before being milked. The pasture must be free from noxious weeds, and the barn and yard and the animals themselves must be neat. The udder should be washed before the milking, and the hands and clothing of the milkers and dairy workers should be kept clean; and the same aseptic precautions must be observed with cans, pails, and every implement with which the milk comes in contact.

The milk must be at once thoroughly cooled.

This is best accomplished by placing the can in a tank of cold spring-water, or in ice-water, the water being of the same depth as the milk in the can. It is well to keep the water in the tank flowing; indeed, this is necessary unless ice-water be used. The can should remain uncovered during the cooling and the milk should be gently stirred. The temperature should be reduced to 45° F. within an hour, and the can must remain in the cold water until the time for delivering.

In summer, when ready for delivery, the top should be placed in position and a cloth wet in cold water spread over the can, or refrigerator cans may be used. A still better plan is to serve the milk in glass jars having air-tight tops. At no season should the milk be frozen, and, on the other hand, no buyer should receive milk having a temperature over 65° F.

When the milk and cream are not served in sealed glass jars, it is well to provide two sets of small cans, one set to be thoroughly cleansed and aired while the other is taken away by the milkman to bring back the next supply. When this arrives in the morning, or in the morning and evening in hot weather, the milk should be emptied into separate and absolutely clean earthenware or glass vessels with secure tops, and these put at once into a refrigerator reserved exclusively for them. This may stand in some convenient spot near the nursery,

but not in it, and especially not in an adjoining bath-room. With a good refrigerator there is no difficulty in keeping milk perfectly sweet for twenty-four hours in winter and for twelve hours in summer, except on intensely hot days; then it may be necessary to Pasteurize the whole of the supply when received, in order to prevent change.

As milk exists in the healthy cow's udder it is aseptic, but during milking and subsequent handling and transportation it often becomes contaminated by various foreign materials, both organic and inorganic, which either are apt to set up some injurious change in the fluid before ingestion, or give rise to various disturbances after entering the alimentary canal. Again, if the cows themselves be unhealthy, their milk may carry disease germs. The germs most frequently present are the saprophytic bacteria, potent in the production of diarrhœal disorders; the bacillus tuberculosis; and the germs of cholera, diphtheria, scarlet and typhoid fevers, all of which are readily taken up by and flourish in milk at ordinary temperatures. To deprive these accidentally introduced organic impurities of their activity the milk must be subjected to sterilization. It must be insisted here that this process is a *preventive*, and in no sense a therapeutic measure; that it is not to be recommended when one can be sure of the purity of the milk supplied

and of the conditions for its preservation; and that milk so treated must be modified according to the age and demands of the individual case in the usual way. Sterilization may be conducted either at a *high* or *low* temperature.

Sterilization at a High Temperature (212° F).—Several admirable implements have been devised

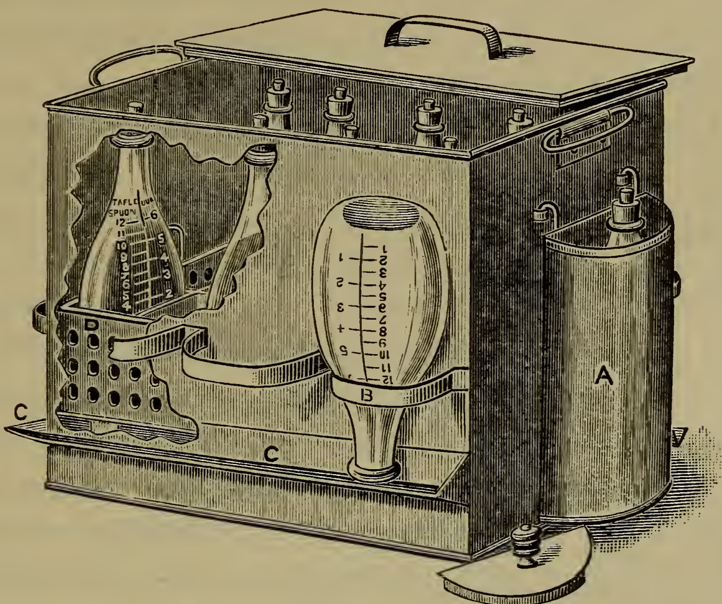

FIG. 21.—AUTHOR'S STERILIZER.

for conducting the process; one of the most simple, made after a design by the author, is shown in Fig. 21.

This apparatus is made of tin, and consists of an oblong case provided with a well-fitting cover, and

having a movable perforated false bottom (D), which stands a short distance above the true one and has attached a framework capable of holding ten six-ounce nursing bottles. On the outside of the case is a row of supports (B) for holding bottles inverted while drying, and at the proper distance below these a gradually inclining gutter (C) for carrying off the drip. A movable water-bath (A) is hung to the side; in this each bottle of food may be heated at the time of administration.

The bottles are made of flint glass and are graduated; the graduated markings being especially convenient for measurement and rendering the use of a separate measuring-glass unnecessary, a matter of no little moment, as every implement that comes in contact with the milk in sterilization must be kept chemically clean. Ten bottles are used, so that the whole supply of milk intended for a day's consumption can be prepared at once. Each bottle is provided with a perforated rubber cork, which in turn is closed by a well-fitting glass stopper.

Sterilization should be performed in the morning as soon as possible after the milk has been delivered. The process is as follows: First, see that the ten bottles are perfectly clean and dry; pour into each six fluidounces (12 tablespoonfuls) of milk; insert the perforated rubber corks, without the glass stop-

pers, however; remove the false bottom and place the bottles in the frame; pour into the case enough water to fill it to the height of about two inches; replace the false bottom carrying the bottles; adjust lid, and put the whole on the kitchen range. Allow the water to boil, and, by occasionally removing the lid, ascertain that the expansion that immediately precedes boiling has taken place in the milk; then press the glass stoppers into the perforated corks, and thus hermetically close each bottle. After this, keep the apparatus on the fire and the water boiling for twenty minutes. Finally, remove the false bottom with the bottles; pour out the water, replace, and carry the whole, covered with the lid, to the nursery.

When the hour of feeding arrives, put one of the bottles into the attached water-bath and heat it to the proper point for administration. The milk must, of course, be diluted with filtered water, and receive the additions ordinarily made to adapt it to children of different ages. The tip used—and a tube must not be employed even here—should be thoroughly cleaned, and immersed for a few moments in boiling water before it is attached to the bottle.

As soon as a bottle is emptied—and if the whole of its contents be not taken, the remainder must be thrown away—it is washed in the ordinary manner

with a solution of bicarbonate of sodium (one teaspoonful to a pint of water) and placed in the rack (B) to drain and dry.

Milk sterilized by the above process will remain sound for several days—according to some authorities, as many as eighteen—when the heating is continued for thirty minutes, and still longer if protracted for an hour and a half. It is especially useful in traveling, when fresh milk cannot be obtained; for use in cities during the heat of summer, when milk is most apt to undergo injurious changes; for a temporary change of food for delicate children, or for those suffering from diseases of the stomach or intestinal canal. But the experiments of Leeds show that sterilization at the boiling-point of water causes the following modifications: Casein is rendered less coagulable by rennet, and is acted on slowly and imperfectly by pepsin and pancreatin; proteid matters attach themselves to fat globules, and probably bring about a less perfect assimilation of fat; while milk sugar, by prolonged heating, is completely destroyed. Koplik states that "from the temperature of 167° F. upwards, there is a separation of the serum-albumin of the milk; the casein loses its coagulability to rennet, and at 185° F. amounts of rennet which for the raw condition of the milk are found sufficient to act, cease to be effective." On account of these alterations milk sterilized at a

high temperature is difficult to digest, and many infants do not thrive upon it, become constipated, are badly nourished and anæmic, and sometimes develop scurvy.

The problem, therefore, that presents itself in the sterilization of milk for infants' food is to devise a method which shall efficiently destroy the contained germs, and yet in the least possible degree interfere with its ready digestion and its nutritive qualities. This is best accomplished by:

Sterilization at a low temperature, or *Pasteurization*.—Hueppe considers that from a physiological standpoint milk is best sterilized under a temperature of 167° F., while other experimenters have shown that temperatures lower than 212° F., if continued for a short time, will destroy a very large proportion of the germs, and will destroy with certainty many pathogenic germs which find their way into milk either from the cow or as external contaminations. The elaborate experiments of Yersin, Granchier, Lidoux-Libard, and Bitter show that the bacillus tuberculosis in milk will be destroyed in ten minutes by an exposure to 167° F., in fifteen minutes to 158° F., and in thirty minutes to 154.5° F. Concerning other bacteria, Van Geuns found that a few seconds' exposure to 140° F. would kill the cholera spirilla, the typhoid bacillus, and the pneumococcus.

It may, therefore, be concluded that a temperature of not less than 158° F. will render milk sufficiently germ-free for infant food. It is also certain that a temperature of less than 176° F. produces no alterations in the composition of milk that affect its digestibility.

Methods of Pasteurizing milk in bulk have been brought forward both in Germany and in this country, and now the procedure has been reduced to an easily managed system for household use. This depends upon the fact that the temperature of the milk to be treated may be raised to about the desired point (167° F.) by immersing a certain definite quantity of milk in a properly porportioned bulk of boiling water, the source of heat having been removed. A convenient apparatus for nursery use is Dr. Freeman's Pasteurizer (Fig. 22).

The apparatus consists of a pail for water and a receptacle for the bottles of milk. The *pail* is a simple affair with a cover. Extending around it is a groove for indicating the level to which it is to be filled with water; inside are three supports (C) for holding the receptacle. The *receptacle* for the bottles consists of a number of hollow cylinders fastened together and surrounded by a wire (A), which rests on the support (C) when the milk is being heated. Below the wire (A) are three short wires (B); these rest on the supports (C) when the receptacle is raised

for cooling. The steps of the process are as follows:

Fill the pail to the level of the groove with water,

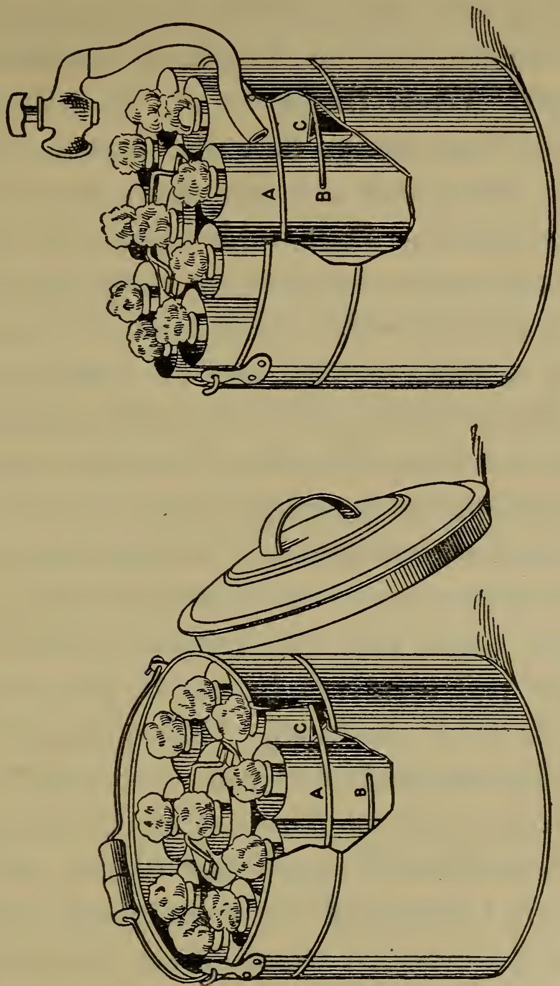

Fig. 22.—Freeman's Pasteurizer.

cover it, and put it on the stove to boil, the receptacle for the bottles having been left out. Fill the body

of each bottle with milk or some modification of milk in proper proportion for feeding; stopper with a wad of cotton-batting and put in a refrigerator. If all the bottles which the receptacle holds are not needed, fill the remaining cylinders with cold water. When the water in the pail on the stove boils thoroughly, take the bottles of milk from the refrigerator and put them in the spaces in the receptacle. Pour cold water into each of these spaces so as to surround the body of the bottle. Take the pail of boiling water from the stove and put it on a table or mat, not on metal or stone. Be sure that the pail is still filled exactly to the level of the groove and that the water is boiling vigorously. Put the receptacle containing the bottles of milk into the pail of boiling water, so that the wire (A) will rest on the support (C); cover the pail quickly and let it stand forty-five minutes. During this period the pail must not be on the stove and the cover must not be removed. Now uncover the pail and lift the receptacle and turn it so that the wire (B) will rest on the support (C), thus elevating the top of the receptacle above that of the pail. Put the whole in a basin under a faucet to which a rubber pipe may be attached connecting it with the pail. The water will overflow from the pail into the basin. Or the pail may be placed under a pump, fresh cold water being pumped into it every few minutes.

When, however, it is not possible to cool the milk in this way, place the receptacle containing the bottles in iced water, or stand the bottles on wood in a refrigerator. To warm the milk for use, put the bottle containing it in a vessel of cold water on the stove, and leave it until it is warm. Use a fresh bottle for each feeding. Wash the bottles thoroughly after using, and once a day put all the empty bottles in a kettle of cold water on the stove and let this water boil for an hour. The bottles should then be taken out and placed bottom up until used.

A sufficiently perfect apparatus may be readily improvised. All that is required is a bottle-rack similar to that of the Arnold sterilizer, and a tin pail large enough to receive the rack and bottles and provided with a well-fitting cover. In conducting the process fill the bottles, previously perfectly cleaned, with milk and stop them with cotton; place them in the rack, and this in turn in the pail; pour into the pail enough *boiling* water to come up to the level of the milk in the bottles; adjust the cover, and let the whole stand on a wooden table until the water becomes cool—twenty to thirty minutes; lastly, place the bottles in a refrigerator.

Pasteurized milk so prepared and placed in a refrigerator will keep perfectly sound and sweet for twenty-four hours at least. Its advantage as a food lies in its sterility, and, like ordinary milk,

it must be modified by the addition of water, cream, and milk sugar to meet the special demands of each case.

The various milk mixtures are often Pasteurized, the method being the same as for pure milk.

Childhood.—Children who have cut their milk teeth may be fed for a twelvemonth—namely, up to the age of three and a half years—as follows:

First meal, 7 A.M.—One or two tumblerfuls of milk, a saucer of thoroughly cooked oatmeal or wheaten grits with cream and salt, and a slice or two of bread and butter.

Second meal, 11 A.M. (if hungry).—A tumblerful of milk or a teacupful of broth with a biscuit.

Third meal, 2 P.M.—A slice of underdone roast beef or mutton, or roast chicken or turkey, minced as fine as possible; a baked potato thoroughly mashed with a fork and moistened with gravy, or one well-cooked green vegetable, as spinach, young peas mashed with a fork, or stewed celery, and bread and butter; a saucer of junket or rice-and-milk pudding.

Fourth meal, 7 P.M.—A tumblerful of milk and one or two slices of well-moistened milk toast.

Orange-juice, apple scraped with a spoon, ripe peaches, and cooked fruit not oversweetened, may be allowed, especially if there be a tendency to constipation.

From three and one-half years up the child must take his meals at the table with his parents, or with some reliable attendant who will see that he eats leisurely. The diet, while plain, must be varied. The following list will give an idea of the food to be selected:

BREAKFAST.

Every Day.	One Dish Only Each Day.	
Milk.	Fresh fish.	Eggs, plain omelet.
Porridge and cream.	Eggs, lightly boiled.	Chicken hash.
Bread and butter.	" poached.	Stewed kidney.
	" scrambled.	Stewed liver.

Sound fruits may be allowed before and after the meal, according to taste, as oranges, grapes without pulp (seeds not to be swallowed), peaches, thoroughly ripe pears, cantaloupes, and sometimes strawberries.

DINNER.

Every Day.	Two Dishes Each Day.	
Clear soup.	Potatoes, baked.	Stewed celery.
Meat, roasted or broiled, and cut into small pieces.	" mashed.	Cauliflower.
	Hominy.	Peas.
	Macaroni, plain.	String-beans, young.
Bread and butter.	Spinach.	Green corn, grated.
		All green vegetables.

Junket, rice-and-milk or other light pudding, and occasionally ice cream, may be allowed for dessert.

SUPPER.

Every Day.

Milk.

Milk toast, or bread and butter.

Stewed fruit, baked apple.

Water—and this must be really pure—should be the only drink, tea, coffee, wine or beer being entirely forbidden.

Fried food, highly seasoned or made-up dishes, are to be excluded, and no condiment but salt is to be used.

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Eating, however little, between meals must be absolutely avoided. Keep a young child from knowing the taste of cakes or bonbons, or, having learned it, let him feel that they are as unattainable as the thousand other things beyond his reach, and he soon ceases to ask for them. Even a piece of bread between meals should be forbidden. His appetite then remains natural, and he will eat proper food at his regular meal hours.

As to the quantity, a healthy child may be permitted to satisfy his appetite at each meal, under the one condition that he eats slowly and masticates thoroughly.

In case of illness, the diet must be reduced in quantity and quality, according to the rules that are applicable to adults.

CHAPTER IX.

DIETARY.

In the preceding chapter so much attention has been devoted to the subject of the artificial feeding of infants, and so many formulas have been given for the modification of cows' milk as a substitute for the natural food, or human milk, that I shall only refer here to a few milk mixtures, some of which have been recommended by other writers. After describing these, certain methods of peptonization and the mode of preparing a number of dishes adapted to the nursery, whether occupied by well or ill children, will be discussed. In regard to the latter, however, the dishes that ordinarily come upon the table will not be referred to, as any good cook ought to know how to make them. Finally, a series of diets for special diseases of childhood will be detailed.

MILK AND OATMEAL.

Bethlehem oatmeal (fine powder)	1 teaspoonful.
Water	2 tablespoonfuls (fld. oz. 1).
Milk	5 tablespoonfuls (" " 2½).
Gravity cream (16%)	1 tablespoonful (" " ½).
Sugar of milk	1 teaspoonful.

Heat the water just short of boiling; stir in the oatmeal slowly until a smooth white mixture is obtained; then add the other ingredients. For an infant of three months; useful in constipation.

MEIGS' FOOD.

Milk	1 tablespoonful	(fld. oz. ½).
Cream	2 tablespoonfuls	(" " 1).
Lime-water	2 tablespoonfuls	(" " 1).
Milk-sugar solution	3 tablespoonfuls	(" " 1½).

For a child under one month; quantity to be increased as age advances, but no change to be made in quality until after the eighth or ninth month.

The milk sugar solution consists of 17¾ drachms —a little over 17 teaspoonfuls of milk sugar—to a pint of pure water. This is the food recommended by Dr. A. V. Meigs.

TOP MILK MIXTURES.

Dr. Joseph E. Winters* employs a cream food during the first three weeks. Afterward he uses, for different ages, a specified quantity of the upper layer *dipped* from a quart of whole milk sixteen hours after milking, and modified by the addition of milk sugar, lime-water and filtered water. As this scheme of feeding has proved exceedingly successful I present it in the following table:

* "Feeding in Early Infancy," reprint from Medical Record, March 7, 1903.

GENERAL FORMULAS.

Age.	Cream.	Upper Layer Milk.	Milk Sugar.	Lime-water.	Filtered Water.	Amount at Each Feeding.	Number of Feedings.
1st and 2d days . . .	1 oz. (*a*)	. .	3⅓ teaspoonfuls	1½ oz.	9 oz.	½ oz.	10
3d day	1 oz. (*b*)	. .	3⅓ teaspoonfuls	1½ oz.	9 oz.	1 oz.	10
4th to 7th day . . .	1½ oz. (*c*)	. .	4 teaspoonfuls	2 oz.	10½ oz.	1 oz.	10
2d week	2¼ oz. (*d*)	. .	4 teaspoonfuls	2 oz.	10 oz.	1½ oz.	10
3d week	. .	6 oz.	7 teaspoonfuls	4 oz.	18 oz.	2 oz.	10
4th to 8th week . . .	. .	9 oz.	8 teaspoonfuls	4 oz.	19 oz.	2½ oz.	10
9th to 12th week . .	. .	11 oz.	7½ teaspoonfuls	4 oz.	17 oz.	3–4 oz.	8
4th month	. .	13 oz.	7 teaspoonfuls	4 oz.	15 oz.	3–4 oz.	7
5th and 6th months .	. .	15 oz.	6⅔ teaspoonfuls	4 oz.	13 oz.	5 oz.	7
7th to 9th month . .	. .	17 oz.	5½ teaspoonfuls	4 oz.	11 oz.	5–6 oz.	6
10th and 11th months	. .	21 oz.	4⅓ teaspoonfuls	4 oz.	7 oz.	6 oz.	5
12th month	. .	25 oz.	2¾ teaspoonfuls	4 oz.	3 oz.	6 oz.	5

(*a*) (*b*) Dip upper ½ ounce from each of *two* quart bottles of milk, sixteen hours standing. (*c*) Dip upper ½ ounce from each of *three* quart bottles of milk, sixteen hours standing. (*d*) (*et seq.*) Dip quantity from *one* quart bottle of milk, sixteen hours standing.

Dr. Winters also suggests that the modifications employed during the hot months of summer should

be distinctly different from those adapted for general use in the cooler months. These weaker formulas are tabulated below:

SUMMER FORMULAS.

Age.	Cream.	Upper Layer Milk.	Milk Sugar.	Lime-water.	Filtered Water.	Amount at Each Feeding.	Number of Feedings.
1st week	1 oz. (*a*)	.	$3\frac{1}{3}$ teaspoonfuls	$1\frac{1}{2}$ oz.	9 oz.	$\frac{1}{2}$–1 oz.	10
2d week	$1\frac{1}{2}$ oz. (*b*)	. .	4 teaspoonfuls	2 oz.	$10\frac{1}{2}$ oz.	$1\frac{1}{2}$ oz.	10
3d and 4th weeks . .	$2\frac{1}{4}$ oz. (*c*)	. .	4 teaspoonfuls	2 oz.	10 oz.	2–$2\frac{1}{2}$ oz.	10
5th and 6th weeks .	. .	6 oz.	7 teaspoonfuls	4 oz.	18 oz.	$2\frac{1}{2}$ oz.	10
7th week to end of 3d month	. .	9 oz.	8 teaspoonfuls	4 oz.	19 oz.	$2\frac{1}{2}$–4 oz.	8
4th month	. .	11 oz.	$7\frac{1}{2}$ teaspoonfuls	4 oz.	17 oz.	4 oz.	7
5th and 6th months .	. .	13 oz.	7 teaspoonfuls	4 oz.	15 oz.	5 oz.	7
7th month	. .	15 oz.	$6\frac{2}{3}$ teaspoonfuls	4 oz.	13 oz.	5–6 oz.	6
8th and 9th months .	. .	17 oz.	$5\frac{1}{2}$ teaspoonfuls	4 oz.	11 oz.	5–6 oz.	6

(*a*) Dip upper $\frac{1}{2}$ ounce from each of *two* quart bottles of milk, sixteen hours standing. (*b*) Dip upper $\frac{1}{2}$ ounce from each of *three* quart bottles of milk, sixteen hours standing. (*c*) (*et seq.*) Dip quantity from *one* quart bottle of milk, sixteen hours standing.

In the above the strengthening is more gradual than in the General Formulas.

"In infancy, and always in summer, one-fourth the quantity of food should be lime-water. Constipation is an indication for diminution of lime-water."

Dr. Henry Dwight Chapin also recommends top-milk feeding. He uses the purest obtainable milk, taken from a herd of cows and bottled and cooled as quickly as possible. Upon delivery such milk shows a distinct layer of cream in the neck of the bottle. He writes:

"For young infants, remove from the top of a quart bottle all the cream and enough milk to make nine ounces, and mix in a pitcher or bowl for dilution. This is called nine-ounce top milk. (Fat to proteids, three to one).

"For the older infants, remove from the top of a quart bottle all the cream and enough milk to make sixteen ounces (one pint) and mix in a pitcher or bowl for dilution. This is called sixteen-ounce top milk. (Fat to proteids, two to one).

"For young infants, one part of the nine-ounce top milk should be mixed with three to eight parts of the diluent, and one part of sugar added to twenty to thirty parts of food; granulated or milk sugar may be used.

"For older infants, one part of the sixteen-ounce top milk should be mixed with one to two parts of the diluent, and one part of sugar added to twenty to thirty parts of food; granulated or milk sugar may be used.

"In every instance begin on a weak mixture and gradually decrease the dilution."

The following table, given by Dr. Chapin, shows the simplicity of preparing food by his method, and indicates the quantities and dilutions ordinarily required. Each mixture can be prepared from one quart of milk:

PROGRESSIVE INCREASE OF QUANTITY AND STRENGTH OF MIXTURES.

Sixteen ounces—one-eighth top milk. Eight 2-oz. feedings; one every two hours.	2 oz. of 9-oz. top milk (after being removed from bottle and mixed). 14 oz. diluent.* 1 oz. sugar.†
Twenty-one ounces—one-seventh top milk. Eight 2½ oz. feedings; one every two hours.	3 oz. of 9-oz. top milk (after being removed from bottle and mixed). 18 oz. diluent. 1 oz. sugar.
Twenty-four ounces—one-sixth top milk. Eight 3-oz. feedings; one every two hours.	4 oz. of 9 oz. top milk (after being removed from bottle and mixed.) 20 oz. diluent. 1 oz. sugar.
Thirty ounces—one-fifth top milk. Seven 4-oz. feedings; one every two and one-half to three hours.	6 oz. of 9-oz. top milk (after being removed from bottle and mixed.) 24 oz. diluent. 1½ oz. sugar.
Thirty-six ounces—one-fourth top milk. Six 6-oz. feedings; one every three hours.	9 oz. top milk from one quart bottle. 27 oz. diluent. 1½ oz. sugar.
Forty-two ounces—one-third top-milk. Six 7-oz. feedings; one every three hours.	14 oz. top milk from one quart bottle. 28 oz. diluent. 2 oz. sugar.
Forty ounces—one-half top milk. Six 7-oz. or five 8-oz. feedings; one every three to three and one-half hours.	20 oz. top milk from one quart bottle. 20 oz. diluent. 1 oz. sugar.
Forty-eight ounces—two-thirds top milk. Six 8-oz. or five 10-oz. feedings; one every three and one-half hours.	1 quart of milk. 1 pint of diluent.

* Diluent may be water, plain cereal gruel, or dextrinized gruel.

† Two level tablespoonfuls of granulated sugar or three of milk sugar equal about one ounce; either may be used.

To make cereal gruel, beat up one or two heaped tablespoon-

MILK AND WHITE-OF-EGG FOOD.

The whites of three eggs.
Lime-water................3 tablespoonfuls (fld. oz. 1½).
Milk......................1 pint.

Shake the egg and lime-water forcibly together for five minutes; then add the milk slowly with constant stirring, occupying ten minutes in the process; keep in a cool place.

PEPTONIZED FOODS.

For the process of peptonization, or predigestion, the extractum pancreatis, prepared by Fairchild Bros. & Foster, New York, gives, in my experience, the most satisfactory results, and in all the recipes given below this preparation is to be used.

PEPTONIZED MILK, NO. 1.

One peptonizing tube.
Water.....................1 teacupful (fld. oz. 4).
Milk, fresh and cold........1 pint.

Put the powder contained in the tube into a clean quart bottle; add the cold water and shake well;

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fuls of barley, wheat, or rice flour, or double the quantity of rolled oats, with enough cold water to make a thin paste. Pour on a quart of boiling water, and boil (preferably in a covered double boiler) for at least fifteen minutes.

To dextrinize, after cooking place the boiler in cold water and when the gruel is cool enough to be tasted without burning the tongue, add one teaspoonful of diastase solution and stir. When the gruel becomes thin, strain, add salt, and cool.

then pour in the milk and shake the mixture thoroughly again. Place the bottle in water of about 115° F., or so hot that the whole hand can be held in it without discomfort for a minute, and keep the bottle there for ten minutes. Then put the bottle in contact with ice to check further digestion and to keep the milk from spoiling.

Peptonized milk should have a slightly, but not decidedly, bitter taste. It may be made palatable by serving with grated nutmeg, sugar, or a little brandy, or it may be taken with Apollinaris or Vichy water. In the latter case put the water first into the glass, then quickly pour in the peptonized milk and drink while effervescing.

PEPTONIZED MILK, NO. 2.

Mix the peptonizing powder, water and milk in a bottle, and place in a hot-water bath exactly as directed in the above. Let the bottle remain in the hot water for *one hour*, then pour into a saucepan and *heat to boiling*. This specially peptonized milk is used in making jellies, etc. It may be immediately used if required hot, or set aside on ice for punches, etc.

The object of raising the liquid to the boiling-point is to abolish the activity of the pancreatin, so that it may not act secondarily upon other substances prepared with the milk.

PARTIALLY PEPTONIZED MILK.

Take the same ingredients mixed as before. Place the saucepan on a hot range or gas stove and heat with constant stirring until the mixture boils, being careful to so apply the heat that boiling will take place at the end of ten minutes. When cool strain into a clean bottle; cork well, and keep in a cool place. When needed shake the bottle and serve the required portion cool or hot as desired. By this method peptonization is more advanced than by the next process, but the milk will not become bitter.

PEPTONIZATION BY COLD PROCESS.

Take the same ingredients and mix them as before, but immediately place the bottle on ice without subjecting it to any heat.

This preparation is useful in cases of enfeebled digestive power, or as a means of returning from predigested milk to ordinary milk. It has no special taste.

PEPTONIZED MILK GRUEL.

One peptonizing tube.
Wheat flour or arrowroot....1 heaping teaspoonful.
Water, cold...............½ pint.
Milk, cold................1 pint.

Make a smooth mixture of the arrowroot and water; heat this with constant stirring until it has boiled briskly for three minutes; next add the milk;

strain into a pitcher and stir in the peptonizing powder; let the mixture stand in the hot-water bath, 115° F., for thirty minutes; then pour into a clean bottle and place on ice.

PEPTONIZED MILK PUNCH.

Fill an ordinary thin glass tumbler one-third full of cracked ice; pour on it from one to four teaspoonfuls, according to the child's age, of St. Croix rum, and a dash of Curaçao; add sugar to taste, and then fill the glass with peptonized milk; shake well and grate a little nutmeg on top; strain.

EFFERVESCING MILK PUNCH.

Prepare the tumbler and ice as in the above, squeeze in the juice of half a lemon, add sugar to sweeten, and fill the glass with half Apollinaris and half peptonized milk. The milk used in this punch must be prepared by the second process.

PEPTONIZED BEEF TEA.

To one-quarter of a pound of minced raw beef, entirely free from fat, add one-half pint of cold water; cook over a slow fire, with constant stirring, until it has boiled a few minutes; then pour off the liquor and beat or rub the meat to a paste; put the latter into a jar with one-half pint of cold water, and pour in the liquid previously obtained. Add to this

mixture twenty grains of extract of pancreas and fifteen grains of bicarbonate of sodium; shake all well together, and keep at a temperature of about 110° to 150° F., stirring occasionally, for three hours. Next boil quickly, strain, and serve as required.

PEPTONIZED OYSTERS.

(Originally suggested by the late Dr. N. A. Randolph.)

Take half a dozen large oysters with their juice and half a pint of water. Heat in a saucepan until they have boiled briskly for a few minutes. Pour off the broth and set aside. Mince the oysters fine in a wooden bowl, and reduce them to a paste with a potato masher. Next put the oysters in a glass jar with the broth which has been set aside, and add fifteen grains each of extract of pancreas and bicarbonate of sodium. Let the jar stand in hot water or in a warm place, where the temperature is not above 115° F., for one and one-half hours. Next pour into a saucepan and add half a pint of milk; heat over the fire slowly to boiling point, and flavor with salt to taste, and serve hot.

HUMANIZED MILK.

Peptogenic milk powder....	1 level teaspoonful.
Milk, fresh and cold	4 tablespoonfuls (fld. oz. 2).
Water......................	4 tablespoonfuls (" " 2).
Cream......................	1 tablespoonful (" " ½).

Heat cautiously over a flame, stirring constantly

with a food thermometer* and being careful to observe that the temperature is maintained at about 115° F. for full six minutes; never let the mixture boil. Then put into a nursing bottle, let it cool to 98° F., and it is ready for administering. The cup should be held by the hand over the flame, thus making it easy to regulate the heat to which the milk is exposed.

It is important to follow out these directions *absolutely*, for should the temperature of the mixture not be maintained at a sufficiently high point, the pancreatin contained in the peptogenic powder will perform its work imperfectly; on the other hand, should the heat nearly approach the boiling-point all digestive activity will be suspended.

Humanized milk so prepared is adapted to the average infant's digestion. As age advances, the proportion of milk may be increased to a proportion as high as 2 to 1 of water, and the total quantity of the mixture augmented. As an increase in quantity is made, it is necessary to preserve the relations of the peptogenic powder to the liquid; namely, one teaspoonful to each four ounces and a half.

Sometimes it will be found necessary to carry the process of predigestion further than can be accom-

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*A bath thermometer taken out of its wooden frame makes a serviceable and sufficiently accurate instrument for observing temperature in food preparation.

plished by following the directions already given. This may be readily done by increasing the length of the time of heating. One can thus easily produce in the milk any degree of change up to complete peptonization, when the liquid becomes clear and very bitter. Conversely, when it is desirable—in case of returning health, for instance—to resume a plain milk diet, the time of heating is gradually shortened until the powder is added to the milk mixture just at the time of feeding. When the time comes to abandon the digesting powder entirely it is most important to supply its place in the food by an equal bulk of milk sugar.

The milk and cream referred to are of such quality as can be obtained from a reliable city dealer; extra rich milk or cream may, under some circumstances, require to be more diluted.

MEAT BROTHS, Etc.

BEEF TEA, NO. 1.

Take one pound of lean beef and mince it; put it, with its juice, into an earthen vessel containing a pint of clear water at a temperature of 85° F., and let the whole stand for one hour. Strain well through stout muslin, squeezing all juice from the meat; place on the fire, and, while stirring briskly, slowly heat the liquid just to the boiling-point. Then remove at once and season with salt.

When administering this, be careful to stir up whatever sediment may be present.

BEEF TEA, NO. 2.

Take half a pound or a pound—according to strength required—of rump steak; cut it into small pieces; free it completely from fat and tendon, and put it, with one pint of clear, cold water, into a covered saucepan. Place by the side of the fire for five hours; then let it simmer gently for two hours, and finally skim thoroughly. The meat used should be as fresh as possible, and the saucepan should be of copper or tin, or be enameled on the inner surface.

Beef tea must never be allowed to boil, and in reheating be careful to raise it only to the proper point for drinking.

BEEF TEA IN FIFTEEN MINUTES.

Scrape one pound of lean beef into fibers, and, after placing it in a clean saucepan, pour on half a pint of boiling water; then cover the saucepan closely and place it by the side of the fire for ten minutes; next strain into a teacup; place this in a basin of ice-cold water and remove all fat from the surface of the liquid, first with a spoon and finally with a piece of stale bread or blotting paper; then pour into a warm cup and heat gently to the temperature for drinking.

RAW-BEEF JUICE.

Take one pound of sirloin of beef; warm it on a broiler before a quick fire; cut into cubes of about one-quarter of an inch, and after placing in a lemon squeezer or meat press, forcibly express the juice; remove the fat that rises to the surface after cooling.

This may be given warm or cold, and seasoned with a little salt, in doses of one teaspoonful every two hours to a child of six months to a year old.

The meat must never be actually cooked.

RAW BEEF.

Cut a tenderloin beefsteak into the finest possible pieces and free it as nearly as may be from particles of fat; then place in a mortar and pound until the meat becomes pulpy; next rub through a fine sieve and season with salt and a little black pepper.

A teaspoonful of this pulp three or four times daily will be sufficient for a child one year old.

CLEAR BROWN SOUP.

Cut a shin of beef into pieces; put it into a saucepan with just enough water to cover it; when it boils, skim it, and add a bundle of sweet herbs, a little turnip, carrot, onion and celery, and a little pepper and salt. Let the whole boil until the meat is quite tender; then strain, and let it stand until the next day. After clearing it thoroughly from

fat, heat it again, adding as much browning as will make the soup the color you like. Beat up two eggs, with their crushed shells, till they are quite a froth. Put them into the soup with a whisk; let it boil gently for ten minutes; then strain it through a cloth, and it will be perfectly bright.—(Dr. Ellis.)

CONSOMMÉ.

Make a beef broth by taking one or two pounds of beef, according to the strength required, from the leg, round or chuck; wash well; cut in pieces and put on to boil in three quarts of cold water. While boiling, skim frequently, and when reduced to one quart, take from the saucepan and strain; after which return to the saucepan with a few thin slices of onion, and half a pound of lean beef, chopped fine, and well mixed with three raw eggs; beat all thoroughly with the broth, which is to be returned to the fire and boiled for about half an hour, or until perfectly clear.

CHICKEN BROTH.

A small chicken, or half of a large fowl, thoroughly cleaned, and with all the skin and fat removed, is to be chopped, bones and all, into small pieces; put these, with a proper quantity of salt, into a saucepan and add a quart of boiling water; cover closely and simmer over a slow fire for two

hours; after removing, allow to stand, still covered, for an hour, and strain through a sieve.

MUTTON BROTH.

Lean loin of mutton........	1 pound (exclusive of bone).
Water....................	3 pints.

Boil gently until very tender, adding a little salt or onion, according to taste; strain into a basin, and, when cold, skim off all the fat. Warm, when served.

Should barley or rice be added, they must be first separately and thoroughly boiled, and added when the broth is heated for use.

VEAL BROTH.

Lean veal....................	½ to 1 pound, according to strength required.
Cold water..................	1 pint.

Mince the meat; pour upon it a pint of cold water; let it stand for three hours; then slowly heat to boiling point, and after boiling briskly for two minutes, strain through a fine sieve and season with salt.

OYSTER SOUP.

Drain one pint of oysters through a colander for five minutes, to remove the liquor, and then pour over them one pint of boiling water, which must be thrown aside; add to the liquor already drained a

pint of boiling water and put over the fire in a porcelain-lined saucepan. Boil until all the scum has risen and been skimmed off; then add half a pint of fresh milk, one water cracker rolled to a powder, a piece of butter, and a little salt and pepper; boil ten minutes, and just before the soup is to be served turn in the oysters from the colander and let them scald for three minutes.

ARROWROOT PUDDING.

Mix a tablespoonful of arrowroot with cold water; put it over the fire in a porcelain-lined saucepan; add a pint of boiling milk, stirring constantly, and one egg well beaten with a tablespoonful of white sugar; let it boil five or ten minutes.

If baked pudding be preferred, it may be mixed in the same way and baked, in a moderately quick oven, for twenty or thirty minutes.

BLANC MANGE.

Gelatin	½ ounce.
Water	½ pint.
Cream	1 pint.
White sugar	3 ounces.
Extract of lemon	Sufficient to flavor.

Dissolve the gelatin in the water by means of heat, meanwhile whipping the cream and sugar together and adding the lemon. Next, while the gelatin solution is still warm, pour in the cream slowly, and

beat until stiff enough to drop from the spoon; finally pour in moulds.

Milk may be used instead of water in this preparation.

HOMINY GRITS.

Two tablespoonfuls of hominy, having been boiled soft, are rubbed up with butter until quite light; then, half a pint of boiled milk is added slowly, with constant stirring; next strain through a sieve and boil again; flavor with sugar or salt, and serve hot. Rice may be prepared in the same way.

JUNKET.

Milk............................1 pint.
Essence of pepsin (Fairchild's) ....2 teaspoonfuls.
(Wine of pepsin or liquid rennet may also be used.)

Heat the milk just to a temperature that can be readily borne in the mouth, and add, with gentle stirring, the curdling agent; allow to stand until firmly curded, and serve with sugar, nutmeg, or cream as desired.

JUNKET WITH EGG.

A good custard may be made by adding two eggs, beaten to a froth and sweetened with four teaspoonfuls of sugar to the pint of milk, and then curdling with essence of pepsin. It is well to pour this, when prepared, into coffee cups, one of which will be enough to serve at a time.

MILK AND GELATIN.

Gelatin	1 tablespoonful.
Barley water, hot	½ pint.
Powdered sugar	2 tablespoonfuls.
Milk	1 pint.

Dissolve the gelatin in the hot barley water; add the sugar, and then the milk, stirring all together.

RICE MILK.

Rice	2 tablespoonfuls.
Cornstarch	1 teaspoonful.
Milk	2 pints.

Boil in a farina boiler until each grain of the rice becomes saturated, and the whole creamy in color.

RICE PUDDING.

Take three ounces of rice, and swell it very gently in one pint of new milk. Let it cool; then stir into it one ounce of fresh butter, two ounces of pounded sugar, the yolks of three eggs, and some grated lemon rind. Pour this into a well-buttered dish, but do not quite fill it, and then lay lightly over the top the whites of three eggs which have been well beaten up with three tablespoonfuls of sifted sugar. Put the pudding directly into the oven, the heat of which must be moderate, and bake it for about twenty minutes, or till the egg crust has become lightly browned.

OATMEAL GRUEL.

Mix a large tablespoonful of oatmeal with two tablespoonfuls of cold water, stirring to bring to a state of uniformity; pour this into a pint of boiling water in a saucepan, and boil and stir well for ten minutes. Flavor with salt or sugar.

If the boiling be continued for half an hour, the mixture thickens into a porridge.

SAGO JELLY.

Take two tablespoonfuls of sago; wash carefully; soak for four hours in half a pint of cold water, and then add half a pint of hot water, a pinch of salt, a tablespoonful of sugar and a little grated lemon peel; boil gently fifteen minutes, stirring constantly. A little port wine or sherry may be added just before removing from the fire. May be served hot or cold.

TAPIOCA.

Wash two tablespoonfuls of the best tapioca; soak in fresh water over night; add a little salt, a pint of milk or water, and simmer until quite soft, stirring frequently if milk be used; then pour into bowl and stir while cooling, at the same time adding sugar, some flavoring substance, and wine if desired.

TAPIOCA PUDDING.

Beat the yolks of two eggs with half an ounce of sugar; stir into a pint of tapioca mucilage made with milk, as directed above, and bake in a slow oven.

EGG AND BRANDY.

Brandy....................	8 tablespoonfuls (fld. oz. 4).
Cinnamon water...........	8 tablespoonfuls (" " 4).
The yolks of two eggs.	
White sugar................	1 tablespoonful.

Rub the yolks and sugar together; then add the cinnamon-water and spirit. A dessertspoonful to two tablespoonfuls may be given every two hours, according to the age of the child.

WINE WHEY.

Boil a pint of fresh milk; while boiling, pour in eight tablespoonfuls of sherry wine; bring it to the boil a second time, being careful not to stir it; when it boils, put it aside until the curd settles, and pour off the clear whey.

FLAX-SEED TEA.

Whole flax-seed............	1 ounce.
Bruised licorice root........	2 teaspoonfuls.
Water, boiling.............	1 pint.

Pour the boiling water over the flax-seed and licorice; cover lightly; digest for three hours near a fire, and strain. Two tablespoonfuls of lemon juice may be used as the flavor instead of the licorice.

The following preparations are useful as additions to milk in bottle-feeding:

CARAWAY-WATER.

Caraway seeds, crushed	2 tablespoonfuls.
Water....................	1 pint.

Enclose the seeds in a small muslin bag, and boil in the water until the latter is reduced to half a pint. One or two teaspoonfuls may be added to the bottle in case there be colic.

ALBUMIN-WATER.

Mix, by thoroughly shaking, the raw whites of one or two fresh eggs, with one pint of cold, pure water. Sugar or salt may be added to taste.

BARLEY-WATER.

Put two teaspoonfuls of washed pearl barley into a saucepan with a pint of clear water, and boil slowly down to two-thirds of a pint; strain through muslin.

This is employed to prevent the formation of large, compact curds.

OATMEAL- OR CRACKED-WHEAT WATER.

Add from 1 to 3 tablespoonfuls of well-cooked oatmeal or cracked-wheat porridge to a pint of water; heat almost to boiling-point with constant stirring until a smooth mixture is obtained; strain.

RICE-WATER.

Put two tablespoonfuls of rice, thoroughly washed, into a quart of water and place near the fire, where it may soak and be kept warm for two hours; then boil slowly for one hour, or until the water is reduced one-half, and strain. Useful as a diluent for milk in cases of diarrhœa.

LIME-WATER.

Put a piece of unslaked lime as large as a walnut in an open vessel, pour over it a quart of water and slake it thoroughly; pour off this water, as it contains soluble impurities; stir up the slaked lime with a second quart of water, allow to settle, and again pour away. Next place the washed lime in a two-quart wide-mouthed vessel and fill with boiled and filtered water, stir thoroughly, allow to settle, and use only from the top, replacing water and stirring as consumed; or the clear liquid may be drawn off at once and bottled.

WHEY.

Milk	1 pint.
Essence of pepsin (Fairchild's)	2 teaspoonfuls.

Heat the milk to a temperature that can be agreeably borne by the mouth, and add the pepsin with gentle stirring; let the whole stand until firm coagulation has taken place; then beat with a fork until the curd is finely divided, and strain.

If the whey is to be used with cream in feeding, it should, after being strained, be reheated to a temperature of 160° F. and so kept with constant stirring for three minutes. The object of this is to check the curdling activity of the excess of pepsin, so that when the cream is added there may be no precipitation of its casein and the formation of a curdy mixture.

GELATIN.

Put a piece of plate gelatin, an inch square, into half a tumblerful of cold water, and let it stand for three hours; then turn the whole into a teacup, place this in a saucepan half full of water, and boil until the gelatin is dissolved. When cold, this forms into jelly. From one to two teaspoonfuls may be added to each bottle of milk food. Employed as an attenuant.

FLOUR-BALL.

Take a pound of good wheat flour—unbolted, if possible; tie it up very tightly in a strong pudding-bag; place it in a saucepan of water and boil constantly for ten hours; when cold remove the cloth; cut away the soft outer covering of dough that has been formed, and reduce the hard, baked interior by grating.

In the yellowish-white powder obtained, almost all the starch has been converted into dextrin by

the process of cooking, and the proportion of the nitrogenous principle to the calorifacient is as one to five—nearly the same as in human milk.

This acts both mechanically and as a food.

PEARL-BARLEY JELLY.

Put two tablespoonfuls of washed pearl barley into a quart saucepan with a pint and a half of clear water and boil slowly down to a pint; strain, and allow the liquid to set into a jelly.

Used for same purpose as barley water.

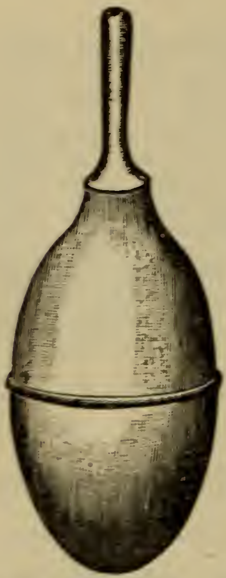

FIG. 23.—SYRINGE FOR NUTRITIOUS ENEMATA.

NUTRITIOUS ENEMATA.

The process of peptonization, already described, is very useful in the preparation of food for absorption by the lining membrane of the rectum. Peptonized milk No. 1, or an egg mixed with a pint of milk and thoroughly peptonized, is the best food for employment in this way, the only caution being to administer in small quantities—from four .to eight tablespoonfuls according to age—and at intervals of not less than four hours. The injection should be made gently and slowly and the liquid should be

warmed to a temperature of 98° F. It is essential, too, in rectal feeding to keep the lower bowel clear by a daily laxative injection of warm water.

The best syringe for the operation is shown in Fig. 23.

DIET IN SPECIAL DISEASES.

In formulating the following diet lists it is necessary to adapt them to definite ages, but, provided the essential idea is adhered to, the quantity of the food may be increased or diminished and the quality altered to suit the age of the special patient.

PARTIAL PEPTONIZATION FOR FEEBLE DIGESTION—AGE, FOUR MONTHS.

Make each bottle of food as follows:

Cream	1 tablespoonful (fld. oz. ½).
Milk	5 tablespoonfuls (" " 2½).
Water	4 tablespoonfuls (" " 2).
Peptogenic milk powder	1 level teaspoonful.

After mixing, heat cautiously over a flame for six minutes, stirring constantly with a food thermometer, being very careful that the temperature of the mixture is maintained between 115° and 120° F. Do not boil. Cool to 98° F. before administering.

Feed every two and one-half hours from 5 A.M. to 10 P.M.

In case each bottle cannot be prepared separately—by far the better way—the whole quantity for each day may be prepared in the morning as follows:

Cream	8 tablespoonfuls (fld. oz. 4).
Milk	40 tablespoonfuls (" " 20).
Water	32 tablespoonfuls (" " 16).
Peptogenic milk powder	8 level teaspoonfuls.

Heat slowly, so as to bring to a full boil at the end of ten minutes; fill eight graduated nursing bottles to the 5-oz. mark, cork with cotton, and place in nursery refrigerator; heat to 98° F. at time of administration.

To return to unpeptonized diet, gradually reduce the time of heating, and finally replace the milk powder by sugar of milk and salt.

A mixture stronger than 2 parts of milk to 1 part of water is difficult to predigest without curdling, especially if the milk be of more than ordinarily good quality.

"NO-MILK" DIET FOR ACUTE GASTRO-INTESTINAL DISORDERS—ACUTE VOMITING, ENTERO-COLITIS, CHOLERIFORM DIARRHŒA, ETC.—AGE, SIX MONTHS.

1.

Whey......................4 tablespoonfuls (fld. oz. 2).
Barley-water................4 tablespoonfuls (" " 2).
Milk sugar..................1 teaspoonful.

For one portion, to be given every two hours.

2.

Flour-ball or barley-jelly ... 1 teaspoonful.
Water......................8 tablespoonfuls (fld. oz. 4).

Mix and add half the white of a fresh egg.

For one portion, to be given every two hours.

3.

Veal-broth (½ lb. of meat to a pint of water),
Barley-water......of each, 4 tablespoonfuls (fld. oz. 2).

For one portion, to be given every two hours.

4.

Raw-beef juice.............1–2 teaspoonfuls (fld. dr. 1–2).

Every two hours.

While on No. 4 the patient must take from 12 to 24 fluidounces of pure water, barley-water, or white-of-egg water each twenty-four hours: to be given in small doses at short intervals.

Resume milk feeding gradually after using any of these diets. Partially peptonized milk food is the best intermediate diet.

DIET FOR CHRONIC GASTRO-INTESTINAL CATARRH—MUCOUS DISEASE OF OLDER CHILDREN.

Breakfast, 7.30 A.M.—One or two tumblerfuls (fld. oz. 8) of milk guarded by lime-water (fld. oz. 2 to tumblerful), the yolk of a soft-boiled egg, and a thin slice of stale unbuttered bread.

Luncheon, 11 A.M.—A cup (fld. oz. 4) of beef-, chicken-, or mutton-broth, entirely free from fat, and a thin slice of dry toast.

Dinner, 2.30 P.M.—Broiled mutton-chops entirely free from fat (one or two, according to size), a large spoonful of well-boiled spinach, and a slice of stale dry bread.

Supper, 7 P.M.—One or two tumblerfuls of milk guarded by lime-water, and a slice of dry toast.

For drink, pure water or Vichy.

Articles permissible for variety.—Beef, poultry, game, fresh fish, raw oysters, cauliflower-tops, asparagus, lettuce, celery, turnips, onions, carrots.

Articles to be avoided.—All farinaceous substances, except stale or toasted bread (wheat or bran); even this must be restricted in quantity; potatoes, peas, beans, parsnips, fruit-cake, pastry, sweetmeats, and butter; tea, coffee, beer, wine, and all condiments except salt.

If there be great debility, small doses of whiskey well diluted may be allowed. Keep skin active by bathing, frictions, inunctions with good olive oil, and warm clothing.

DIET FOR CHRONIC VOMITING IN INFANTS.

Fresh cream................1 tablespoonful (fld. oz. ½).
Whey.....................2 tablespoonfuls (" " 1).
Barley-water..............2 tablespoonfuls (" " 1).

Or,

Weak veal-broth (½ lb. of veal to a pint of water).
Thin barley-water..........equal quantities.

Either food is best given cold, in small quantities and at short intervals—*i. e.*, one teaspoonful every fifteen minutes in bad cases.

As improvement begins, increase both quantity and intervals, but continue to feed with a spoon. After the stomach has been retentive for forty-eight hours, gradually return to bottle-feeding.

Milk food must be very dilute, and partially predigested at first.

In extreme cases No. 4 No-milk Diet (p. 238) may be required for a time.

DIET FOR CHRONIC DIARRHŒA WHEN MILK FOODS UNDERGO ACID FERMENTATION—AGE, SIX TO TWELVE MONTHS.

First meal, 7 A.M.

Veal-broth (½ lb. of veal to a pint of water),
Barley-water..... of each, 6–8 tablespoonfuls (fld. oz. 3–4).

Second meal, 10 A.M.

Cream..................... 1 tablespoonful (fld. oz. ½).
Whey (freshly prepared).... 12 tablespoonfuls (" " 6).

Third meal, 1 P.M.

Same as first, with chicken-broth in place of veal-broth.

Fourth meal, 5 P.M.

Same as second.

Fifth meal, 10 P.M.

Same as first.

If feeble, one meal at 4 A.M., same as second.

In extreme cases No. 4 No-milk Diet (page 238) may be required temporarily, with twice each day—

The yolk of a raw egg,
Ten (10) drops of brandy,
One (1) teaspoonful cinnamon-water, and
One (1) coffeespoonful white sugar,
Well beaten up.

Partial peptonization is an important intermediary in resuming ordinary milk feeding.

Older children require the diet for chronic gastro-intestinal catarrh.

DIET FOR HABITUAL CONSTIPATION IN INFANTS—AGE, THREE MONTHS.

1.

Cream	1 tablespoonful	(fld. oz. ½).
Milk	4 tablespoonfuls	(" " 2).
Milk sugar	1 teaspoonful	(dram 1).
Salt	a pinch.	
Bethlehem oatmeal (fine powder)	2 teaspoonfuls	(drams 2).
Water	3 tablespoonfuls	(fld. oz. 1½).

Heat water almost to boiling-point; add the oatmeal slowly with stirring until a smooth mixture is obtained; then add the other ingredients.

One or two such feedings each day will usually be sufficient, but the oatmeal may be added to each bottle if necessary.

2.

Cream	1 tablespoonful	(fld. oz. ½).
Milk	4 tablespoonfuls	(" " 2).
Milk sugar	1 teaspoonful	(dram 1).
Phosphate of sodium	2 grains.	
Wheat-water	3 tablespoonfuls	(fld. oz. 1½).

To make wheat-water, add to 1 pint of water 1 or 2 tablespoonfuls (according to effect desired) of thoroughly cooked cracked-wheat porridge; heat a little short of the boiling-point, stir constantly until a mixture is obtained, and strain.

Dissolve phosphate of sodium in a teaspoonful of hot water, and add to food just before administration. May be used in one or more feedings as required.

Encourage infant to take water.

Massage of abdomen with warm olive oil, over and in the course of the colon, twice daily, is of much service.

DIET FOR HABITUAL CONSTIPATION IN OLDER CHILDREN—AGE, EIGHTEEN MONTHS TO TWO AND ONE-HALF YEARS.

First meal, 7 A.M.—A breakfast-cupful (fld. oz. 8) of new milk, with an additional tablespoonful (fld. oz. ½) of cream; 2 to 4 tablespoonfuls of thoroughly cooked oatmeal or cracked-wheat porridge, with cream and salt; two slices of whole wheat or bran bread buttered; the juice of a ripe orange, or half of a moderate sized ripe apple scraped with a spoon, or a small ripe pear, scraped, or a peach.

Second meal, 11 A.M.—A teacupful (fld. oz. 6) of milk, with an additional tablespoonful (fld. oz. ½) of cream; a slice of bran bread.

Third meal, 2 P.M.—A breakfast-cupful (fld. oz. 8) of mutton- or chicken-broth, or 1 or 2 tablespoonfuls of underdone roast mutton, or beef, or chicken minced fine and pounded to a paste; purée of spinach; mashed cauliflower-tops; asparagus-tops; stewed celery; whole wheat or bran bread, buttered; junket and cream; rice-and-milk pudding with stewed prune juice; baked apple with cream.

Fourth meal, 6.30 P.M.—Milk, one or two breakfast-cupfuls; whole wheat or bran bread, buttered; stewed fruit.

For drink, pure water only. No condiment but salt.

Avoid farinaceous foods, sugar, candy, cake and pastry.

Massage of abdomen with warm olive oil, over and in the course of the colon, twice daily, is of much service.

DIET IN INFANTILE SCURVY—AGE, EIGHT MONTHS.

First meal, 7 A.M.

Cream	1 tablespoonful (fld. oz. ½).
Milk	9 tablespoonfuls (" " 4½).
Milk sugar	1 teaspoonful (dram 1).
Salt	a pinch.
Water	6 tablespoonfuls (fld. oz. 3).

At 9 A.M., one to two teaspoonfuls of fresh orange juice, according to effect on bowels.

Second meal, 10.30 A.M., same as first.

At 11.30 A.M.—Two teaspoonfuls of raw-beef juice, free from fat, and with a little salt.

At 1 P.M.—One to two teaspoonfuls of fresh orange juice.

Third meal, 2 P.M., same as first.

At 3 P.M.—Two teaspoonfuls of raw-beef juice with salt.

At 5 P.M.—One to two teaspoonfuls of fresh orange juice.

Fourth meal, 6 P.M., same as first.

At 8 P.M.—Two teaspoonfuls of raw-beef juice with salt.

Fifth meal, 10 P.M., same as first.

Milk may be pasteurized or predigested if necessary, but never sterilized, for use in scurvy. Avoid all infant foods.

DIET IN ACUTE NEPHRITIS, SCARLATINAL OR CATARRHAL—AGE, FOUR YEARS.

First meal, 7.30 A.M.

Milk......................	4 tablespoonfuls (fld. oz. 2).
A good Liebig food........	1 tablespoonful (" " ½).
Barley-water...............	11 tablespoonfuls (" " 5½).

Second meal, 10.30 A.M.—A teacupful (fld. oz. 6) of whey.

Third meal, 1.30 P.M.—A teacupful (fld. oz. 6) of veal-broth (½ lb. of veal to a pint of water), mutton-broth (½ lb. of mutton to a pint of water), or chicken-broth; 4 to 8 tablespoonfuls of a light farinaceous pudding.

Fourth meal, 4.30 P.M.—Same as second.

Fifth meal, 7 P.M.—Same as first.

Sixth meal, 10 P.M.—Same as second.

One or two whey feedings may be given during the night if required.

Allow plenty of pure water—Poland water.

In order to spare the kidneys, avoid food having much nitrogenous waste,—*i. e.*, eggs, meat, or too much milk.

DIET IN LITHÆMIA, EXCESS OF URIC ACID IN URINE, GOUTY ECZEMA, ETC.—AGE, FOUR YEARS.

First meal, 8 A.M.—Milk, 7 fluidounces, Vichy water, 1 fluidounce (one or two portions); one or two yolks of soft-boiled eggs with salt, or a bit of fresh fish or sweetbread; or one or two slices of bran or whole wheat bread, dry.

Second meal, 1.30 P.M.—A teacupful of clear meat-broth; a piece of chicken, turkey, wild fowl, or fish; one well-cooked green vegetable,—*i. e.*, spinach, celery, young onions, cauliflower; one or two slices of dry bran or whole wheat bread; junket or rice-and-milk pudding.

Third meal, 6.30 P.M.—Milk as at first meal; sweetbread or milk-toast; dry bran or whole wheat bread.

For drink, Poland water or Vichy (domestic); use either freely.

Avoid fats, starches, sweets, and red meats,—*i. e.*, beef or mutton.

Exercise in fresh air is important.

DIET IN RICKETS WITHOUT DIARRHŒA—AGE, EIGHTEEN MONTHS.

(If diarrhœa be a symptom, use diet for chronic diarrhœa).

First meal, 7.30 A.M.—A breakfast-cupful (fld. oz. 8) of milk, with a tablespoonful (fld. oz. ½) of cream; on alternate days the yolk of a soft-boiled egg, with a little butter, salt, and bread crumbs, and two tablespoonfuls of well-cooked and strained cracked-wheat porridge with cream and salt.

Second meal, 11 A.M.—A breakfast-cupful (fld. oz. 8) of milk, with a tablespoonful (fld. oz. ½) of cream and a slice of whole wheat bread.

Third meal, 2 P.M.—A good tablespoonful of well-minced and pounded mutton or chicken, with gravy and a little crumbled stale bread; a tablespoonful of purée of spinach, or stewed celery or asparagus tops, or cauliflower tops; thin bread and butter.

Fourth meal, 6 P.M.—Milk and cream as at first and second meals; thin bread and butter.

Drink pure water and avoid excess of farinaceous food.

DIET IN PULMONARY PHTHISIS—AGE, SEVEN YEARS.

First meal, 8 A.M.—A breakfast-cupful (fld. oz. 8) of milk, alkalinized with gr. v sodii bicarb.; a soft-boiled egg, or broiled fresh fish, or stewed sweetbread; thin bread, buttered.

Second meal, 11 A.M.—Raw or stewed oysters, or a teacupful of meat-, oyster-, or clam-broth; thin bread, buttered.

Third meal, 2.30 P.M.—A slice of roast beef, or mutton, with gravy, or of poultry or game; a mealy potato, mashed, or well-cooked rice; light farinaceous pudding made with milk; bread and butter; one to two tablespoonfuls (fld. oz. $\frac{1}{2}$–1) of a good dry sherry well diluted with water.

Fourth meal, 6.30 P.M.—A breakfast-cupful (fld. oz. 8) of chocolate or cocoa; milk-toast; stewed oysters or sweetbread; bread and butter.

Farinaceous food and all fat-forming material are indicated, but caution in administration is necessary on account of associated tendency to dyspepsia with acid fermentation.

DIET AND REGIMEN IN CHOREA—CHILDHOOD.

Confine patient to bed, and keep in recumbent position.

At 5.30 A.M., a breakfast-cupful (fld. oz. 8) of warm milk.

At 7 A.M., a breakfast-cupful (fld. oz. 8) of warm milk; three slices (1 oz. each) of bread, buttered.

At 9 A.M., 2 to 4 tablespoonfuls (fld oz. 1–2) of a good liquid extract of malt; or 1 tablespoonful of Merck's dry malt made into a sandwich with bread and butter.

At 10 A.M., massage for fifteen minutes; afterwards give a teacupful (fld. oz. 6) of warm milk.

At 12.30 P.M., dinner of well-cooked fresh vegetables; bread; a breakfast-cupful (fld. oz. 8) of milk; rice or other light pudding.

At 4.15 P.M., same as 7 A.M., with a soft-boiled egg.

At 7 P.M., extract of malt as at 9 A.M.

At 7.30 P.M. massage; afterwards give a teacupful (fld. oz. 6) of warm milk.

At the end of two weeks increase the amount of bread to four slices, add a lamb chop or a piece of chicken to the dinner (12.30 P.M.), and increase portions of milk so that an extra pint is taken during the day. Allow the patient to sit up in bed and have toys to play with. Massage to be increased to half an hour each time.

Never hurry the patient out of bed, especially in severe cases.

CHAPTER X.

MASSAGE.

Systematic manipulation is of great value both as a means of preserving health and as a scientific method of treating certain diseases in children.

Mere rubbing or friction of the surface cannot be included under massage in its literal sense; still, it is a useful form of manipulation, and needs no special instruction, being possible to any intelligent, soft-handed mother or nurse.

Massage, on the contrary, is an art, and, like every other art, requires study and patient preparation for its successful practice. It is a powerful remedy, too, and, like other agents of its class, as potent for evil as for good in unskilled hands. Therefore, to insure good results, a trained masseuse is necessary, and she must act under the direction of the physician.

Massage includes several processes of manipulation. Those given by Murrell, from whose excellent little work* I have taken much of the description of the different "movements," are *effleurage*, *pétrissage*, *friction*, and *tapotement*.

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* "Massage as a Mode of Treatment." W. Murrell.

Effleurage is a stroking movement made with the palm of the hand passing with more or less force over the surface of the body centripetally. The movements are made to follow as nearly as possible the direction of the muscle fibers, and for deep-seated tissues the knuckles can be used instead of the palm. This method is of minor value in itself, but of great use when combined, as is the rule, with the procedures to be described.

Pétrissage consists essentially in picking up a portion of muscle or other tissue with both hands or the fingers of one hand, and subjecting it to firm pressure, at the same time rolling it between the fingers and the subjacent tissues. The hands must move simultaneously and in opposite directions, the skin must move with the hands to avoid giving pain, and the thumb and fingers must be kept wide apart in order to grasp a bulk of tissue, a whole muscle belly, for instance. The manipulation must be uniform, in a direction from the extremities toward the centre of the body, bearing in mind the arrangement of groups of superficial muscles and keeping well in the spaces between them.

Friction, or *massage à frictions*, is performed with the tips of the fingers. It is a pressure movement rather than a rubbing. It is always associated with effleurage, and, to be of any use, must be performed quickly and readily.

Tapotement is a percussion which may be made with the tips of the fingers, their palmar surfaces, the palm of the hand, the back of the half-closed hand, one or other border of the hand, or with the hand partly closed, so as to contain, when brought in contact with the surface of the body, a cushion of air.

The hand of the masseuse must be perfectly clean and soft, and the finger-nails short and smooth. The length and frequency of the sittings must vary with the individual case. Murrell is in favor of short and frequent *séances*, and also recommends *dry* massage, that is, without the use of oil, liniments or ointments; vaseline especially is to be avoided.

Our knowledge of the physiological action of massage is based upon experimental research and clinical experience. Experiments were made by Dr. Gopadze (quoted by Murrell) upon four medical students, who were kept in hospital and subjected to systematic manipulations for twenty minutes or more daily. The séance began with effleurage, followed by pétrissage, friction and tapotement, and ending with a second effleurage. The results were increased appetite and a notable gain in body weight. The body temperature fell, never more than .5°, for about thirty minutes after each massage; then it rose steadily, and an hour

later was generally a degree higher than at the commencement of the operation. The movements of breathing were uniformly increased in frequency, depth and fulness. The pulse varied with the kind of "movement" used,—light surface effleurage increased its frequency, while pétrissage made it slower.

Zabludowski, experimenting on himself and two servants for eighteen days, noted increased bodily and mental vigor and improved appetite and sleep.

Clinical experience shows that massage increases the activity of the circulation, reddens the skin, and elevates the temperature in the part manipulated. It also increases the electrical contractility of muscular tissue, and stimulates the flow of lymph in the lymphatic vessels. Muscular stiffness and fatigue are relieved, nervous irritability is calmed, and restless and wakeful patients are soothed by it into refreshing sleep.

With these facts at hand, it is not difficult to see what a useful agency we possess in skilfully employed massage. By its application we have the power to prevent the wasting of muscles and to augment muscle strength, to build up such tissues as fat and blood, to improve nerve force, both directly by producing a better blood supply and indirectly by relieving irritability and giving rest and sleep; and finally, to hasten the absorption of

waste tissue and of morbid effusions. At the same time it must always be remembered that massage is a powerful remedy. A short séance with gentle movements may do good in infantile palsy, for example, but it does not follow that by doubling the time or force, twice as much benefit will be derived. In fact, the reverse of the proposition is true; short, gentle massage maintains the size and strength of the muscles, while long, forcible manipulation causes them to waste quickly. The same truth runs through the whole question and must be observed.

Before entering upon the therapeutic application of massage proper, it will be well to revert to the process of simple rubbing, already mentioned. This is of much value as a general hygienic measure. Each day, after the bath, the skin having been thoroughly dried by a soft, warm towel, the whole surface should be gently rubbed with the palm of the hand, the process occupying about five minutes. This increases the circulation in the minute blood-vessels, encouraging thorough reaction, aids nutrition and adds vigor to the frame. Weakly children especially thrive under it. In older children, friction with a soft towel may be substituted for hand-rubbing, but this change should not be made before the fifth or sixth year.

Sometimes it is well to rub certain portions of

the body more thoroughly than others. Thus in rickets the spine should receive special attention, in indigestion and constipation, the abdomen; in weak ankles, the feet and legs, etc.; although even in these cases the general surface must receive a share.

Massage may be employed with advantage in the following diseases of childhood:

(*a*) Long-standing stomach or intestinal indigestion (chronic gastro-intestinal catarrh). In this condition the skin is harsh, and often so dry that a shower of dead scales falls from the surface on the removal of the underclothing; the muscle tone is faulty; general nutrition is impaired, and there is a determination of blood from the surface toward the mucous membranes. To get the skin active, and in this way balance the circulation, is an important step in the reëstablishment of normal digestion, secretion and excretion, the essentials of perfect nutrition. To accomplish this, a full, warm bath is administered every evening, just before bedtime, the patient remaining in the water for five minutes. Then the surface is thoroughly dried, and half an ounce of olive oil is gently rubbed into the skin (inunction), the child enveloped in a light blanket and put to bed. After a little time sweating begins. As soon as the sweating is free the skin is again dried and the night-dress put on in

preparation for sleep. Next morning, at some convenient time after breakfast, the child is subjected to twenty minutes' massage. The inunctions are continued until the skin becomes soft and active, and massage is employed daily until there is a decided improvement in the amount of flesh and general strength—a period generally of two or three weeks. Afterward, "movements" every third day will be sufficient to complete the cure.

In these cases massage not only aids the baths and inunctions in their general action, but directly and powerfully increases nutrition and muscle force, and materially hastens an otherwise slow process of recovery.

(*b*) Constipation. Manipulation is a very efficient remedy in habitual constipation, and there are many cases that can be cured by it, combined with a properly regulated diet, without the use of drugs. Pétrissage of the large intestine is the best method, instructions being given to follow the natural course of the fæces through this portion of the gut; thus, beginning in the right groin to proceed upward to the lower border of the ribs on the right side, to cross over, horizontally, to the same region on the left side, and then downward to the left groin. In this way the ascending transverse and descending colon are manipulated in order.

Five or ten minutes every morning, or every

morning and evening in obstinate cases, constitute the proper duration and frequency of the applications. The pressure must be gentle, as delicate underlying tissues are being dealt with.

In this condition I have not found the *dry* method so efficient as a combination of massage with the inunction of warm olive oil.

Sometimes tapotement with the flat hand, with the hand partly closed forming a cushion, or with the margin of the hand, is necessary, but the course of the colon must always be followed. The beneficial action of this mode of treatment is, undoubtedly, threefold: it increases the intestinal and other secretions; it increases the expulsive action of the intestinal muscular fibers, and it mechanically forces accumulated fæcal matter toward the natural gate of exit.

(*c*) Colic. Every experienced mother knows how often "wind," the cause of colicky pain, is expelled from the stomach or intestines by gently rubbing the abdomen with the hand. Any approach to scientific manipulation is much more efficient, and two or three minutes' effleurage may be resorted to, as the urgency of the symptoms requires, with the most satisfactory effect. In this connection it must be remembered, also, that rubbing of the feet to increase the circulation is an important aid in relieving colic.

(*d*) General debility and impoverished blood. These conditions are much benefited by short, frequently repeated courses of massage. In the convalescence from many diseases—both acute and chronic—the above conditions are present, and manipulation, by improving general nutrition, leads to a rapid restoration of strength.

(*e*) Infantile paralysis. Here massage of the paralyzed muscles brings more blood into them and maintains their nutrition until, in favorable cases, new nerve cells take on the function of those which have been destroyed.

In infantile paralysis the affected members are always cold, and the muscles contract feebly, if at all, under the influence of electricity. By systematic massage—pétrissage combined with effleurage and both performed centripetally—an improvement takes place with more or less rapidity. The first indication of this is an increase in the temperature of the parts, continuing for several hours after the rubbing. Then the electrical contractility of the muscles begins to return, and they respond to a battery-current that at the commencement is entirely inoperative.

In recent cases the sittings should be of short duration and frequently repeated, five to ten minutes, three or four times daily. As improvement advances, the frequency may be reduced, and in

chronic cases twice a day will be sufficient at any time.

Electricity is of great aid in the treatment, but it does not take the place of massage, for while it causes contraction and congestion of the muscles and an accumulation of blood in the skin, it does not have the same power of arresting rapid wasting. This branch of the treatment should never be undertaken without the counsel of a physician.

(*f*) St. Vitus's dance (chorea). So far as this branch of the management of chorea is concerned it requires to be aided by proper diet and rest in bed. On the onset of an acute attack the patient is put to bed, given a full supply of good food, and allowed to rest for two days without massage. Should the jerking movements be very violent, the sides of the bed are padded to prevent the child bruising himself, or, if too violent for this, to give security, he is slung in a hammock. At the end of this time the regular treatment is initiated. (For diet and regimen in chorea see page 245.) After two or three weeks of full feeding and rest and massage the patient should be able to sit up in bed, well supported by pillows, and may have a few toys to play with. It is a golden rule, however, never to hurry a patient with chorea out of bed. The muscular strength is more quickly recovered while at perfect rest, and too early exertion often causes a

relapse. While carrying out this plan appropriate medical treatment should be employed.

(*g*) Among other nervous diseases in which massage is practised with success are facial paralysis; neurasthenia and spinal irritability occurring in girls about the approach of puberty, and that painful condition of rheumatic origin so often encountered in young subjects and known as "growing pains."

(*h*) Accumulations of watery fluid between the lungs and the chest wall (pleuritic effusions), enlarged glands, and stiffened rheumatic joints are all benefited by rubbing. In these special instances the manipulations are generally combined with the use of ointments or lotions, though the curative effects cannot be attributed to the latter alone.

In concluding the subject of massage in childhood, it is a point of importance to mention that those cases in which the manipulation is immediately followed by a sensation of comfort or by refreshing sleep are most benefited by it. On the contrary, those cases that are stimulated, derive little benefit, and perhaps positive injury from rubbing. This I have especially noted in cases of general debility and impoverished blood, and my own experience has been confirmed by a number of practical observers in whose judgment I have the greatest confidence.

CHAPTER XI.

EMERGENCIES.

In Chapter I, attention was directed to certain deviations from the features of health that should lead the mother or nurse to suspect the onset of disease. In addition to these, it is of great service to take into account the four seasons of the year, and to be informed of what diseases generally prevail during each.

In the late fall and early winter catarrhal affections are most apt to occur. In catarrh there is an increased secretion of mucus from the lining membrane of either the nose, the throat, the air-tubes or the digestive canal, attended by fever, loss of appetite, thirst and lassitude, with sneezing, hoarseness, cough, vomiting or diarrhœa, according to the situation of the disease.

As winter advances, the bronchial tubes, the lungs themselves and their investing membrane, the pleuræ, are liable to attack, and the signs of bronchitis, pneumonia, or pleurisy may be developed.

In the changeable weather of spring, together with the catarrhal inflammatory disorders already mentioned, epidemics of measles, scarlet fever,

and chicken-pox are most prevalent; while during the summer months disorders of the bowels, such as diarrhœa, "summer complaint" and cholera infantum, swell the mortality lists of the larger cities.

Again, the influence of any hereditary tendency to disease should always be present in the mother's mind, as this not only makes her alive to the possibility of the onset of illness and leads her to seek medical advice in time, but also induces her to shield anxiously her child from known exciting causes, and to adopt hygienic measures calculated to overcome the constitutional predisposition.

In considering the question of emergencies, under which term will be included both accidents and certain conditions of disease, no reference will be made to the management of serious disorders. These, even in their earliest stages, must receive the attention of a physician.

ACCIDENTS AND DISORDERS OCCURRING AT BIRTH OR SOON AFTER.

INJURIES RECEIVED DURING BIRTH.

The shape of the head is sometimes altered by the compression it is subjected to during a prolonged and difficult labor. The deformity is usually in the direction of elongation, the distance from the chin to the back of the head at times measuring six inches or even more. There is no

ground for apprehension in these cases, and the head will regain its natural shape without mechanical interference.

Swellings upon the scalp are quite common. They are due to pressure sustained by the parts in labor. Such tumors gradually subside, if kept free from compression and frequently bathed with cooling lotions; of the latter, alcohol and water, the extract of witch-hazel and water, or diluted lead-water are serviceable.

The face may be congested and blackened, and the features disfigured and distorted from the same cause. A natural appearance, however, will be recovered in a few days without any treatment.

BLEEDING FROM THE NAVEL STRING.

This serious accident occasionally occurs some hours after birth. It arises from the cord being carelessly tied or from its being unusually large at birth and subsequently shrinking, so that the ligature ceases to close the blood-vessels.

To arrest the hemorrhage, the infant's clothes and flannel binder must be removed and the cord exposed; then a new ligature, composed of six strands of strong linen thread, must be applied half an inch nearer the body than the original one, and tied tightly enough to compress thoroughly the vessels, but not so tight as to cut through the cord.

ULCERATION OF THE NAVEL.

The cord generally separates from the navel between the fifth and fifteenth day after delivery, and the parts should then heal without trouble. Occasionally, after the falling of the cord, a small growth, about as large as a pea, appears on the navel, giving rise to a discharge of thin liquid. This may be relieved by applying a little powdered alum and afterward dressing with vaseline or oxide of zinc ointment.

Again, though rarely, excoriation of the navel and surrounding skin takes place, and rapidly spreads, assuming an inflammatory character. The attention of the physician must be called to this. Apply a warm-water dressing should his visit be delayed.

SECONDARY BLEEDING FROM THE NAVEL.

At the time of, or several days after, the separation of the cord, bleeding may take place from the navel. In this event, which is fortunately uncommon, place the point of the finger over the part and steadily, but gently, press it until medical aid can be obtained.

When a bleeding growth appears at the navel, wind a piece of very narrow tape closely around it and leave the whole undisturbed. Under these circumstances the hemorrhage quickly stops and the

growth soon sprouts over the upper edge of the tape and, strangulating itself, drops off.

YELLOW STAINING OF THE SKIN.

During the first few days of life, especially after a difficult and tedious birth, there is apt to be intense congestion of the skin, followed, as the redness fades, by a brownish yellow discoloration. This usually disappears by the tenth day. The coloration resembles that of true jaundice, but there is no yellow staining of the whites of the eyes, nor change in the color of the urine or fæces. Real jaundice occasionally occurs and is a serious condition, requiring careful management.

RETENTION OF URINE AND FÆCES.

Infants frequently do not pass urine for many hours after birth, sometimes not for days. This may be due to complete want of secretion or to some temporary engorgement of the kidneys, which can be relieved by drawing the blood to the surface by immersion in a warm bath—a procedure to be adopted in all cases in which no urine is voided during the first twenty-four hours of life. Often, in lieu of the bath, it will suffice to lay a piece of flannel, wrung out of hot water, upon the lower third of the abdomen, the region over the bladder.

Occasionally some physical malformation leads

to retention of urine, and it is the duty of the nurse to be on the lookout, so that she may early call the physician's attention to the matter. The same condition may also prevail in the bowel, and when twelve hours elapse without any evacuation the parts ought to be carefully examined.

SWELLING OF THE BREASTS.

At birth, or within the following day or two, the mammary glands of an infant may swell, become hard and painful, and secrete a thin fluid much resembling milk. Never make any pressure to remove the secretion, as it may lead to inflammation. When the swelling is moderate, judicious inaction is best, but in severer cases, when the surface is red, and the parts much swollen, and hard and tender to the touch, a hot-water dressing must be constantly applied.

INFLAMMATION OF THE EYES.

This is a most important condition, and, from the outset, requires the attention of the physician and the greatest care on the part of the nurse.

The inflammation usually comes on about three days after birth, in the following manner: on waking from sleep, the child's eyelids are slightly glued together; their edges, particularly at the corners, are redder than natural, and on turning down the

lower lid a little white matter will be observed on the inside. Light causes pain and there is a tendency to keep the eyelids closed. After a short time the lids swell, become red on their external surfaces, and a large quantity of matter is secreted and constantly pours from the eye. Apart from pure medicinal treatment the nurse must keep the eye free from discharge by constantly washing away the matter secreted. Burn the rags or cotton used in this process at once, and it is most important for the attendant not to carry any of the discharge to her own eyes.

HARELIP AND CLEFT PALATE.

These are deformities requiring the attention of the surgeon, and under ordinary circumstances his aid should, in case of simple harelip, be sought within the first six months of the child's life, so that the operation may be well over before dentition begins. The fourth month is the period of election, but should there be difficulty in sucking and any evidences of inanition, the operation may be performed at an earlier age. The operation for cleft palate should not be undertaken before the end of the second year.

So far as the mother is concerned, the question of importance is whether or not there is any interference with the act of sucking. If harelip be

trifling, the infant will be able to suck, provided the mother's nipple be large and the milk flow freely; when the reverse is the case, resort to a nipple shield. In grave cases, especially when harelip is associated with cleft palate, the child is unable to suck either from the breast or from the bottle, and must be fed from a spoon. Occasionally one can succeed in feeding a child so affected from a bottle,

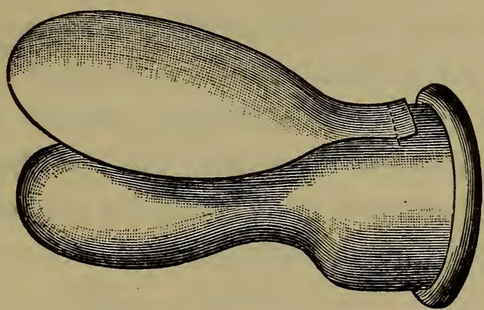

Fig. 24.—Tip with False Palate.

by resorting to a false palate. This consists of a bit of thin india rubber, cut the size and shape of the roof of the mouth and fastened by several firm stitches to an ordinary bottle tip (Fig. 24). In using this instrument, the nurse must insert it into the mouth in such a way that the rubber diaphragm will come uppermost and bridge over the imperfect portion of the palate.

TONGUE-TIE.

In this condition the bridle beneath the tongue is either too short, or is attached so near the tip of the tongue as to interfere, at first, with the movements of the organ in sucking, and, afterward, in speaking. Although frequently suspected, it in reality occurs very rarely. The best way to determine if tongue-tie exist or not, is to watch whether the infant can protrude the tip of the tongue beyond the lips. If so, it will be able to suck a good nipple readily, and nothing need, nor ought, to be done. Should the reverse condition prevail, it will be necessary to nick the bridle, and, as there is considerable danger of hemorrhage in this operation, a surgeon must always be consulted.

ACCIDENTS AND DISORDERS OCCURRING IN INFANCY AND CHILDHOOD.

BRUISES.

A contusion or bruise must be treated as soon as received, if one would relieve pain, lessen swelling and prevent the formation of a black and blue spot. Compresses wet with hot water, a light ice bag,* or a lotion of fluid extract of witch-hazel, are

* Heat and cold act in the same way upon the blood-vessels, contracting them and preventing the transudation of blood. It is the changes occurring in the blood after leaving the vessels that produce the discoloration.

the best remedies. A bruise upon the head in the case of a young infant, and especially when followed by paleness and vomiting, is not to be carelessly overlooked, since it is sometimes the origin of convulsions.

SPRAINS.

Do not make light of a severe sprain, for the consequences are often more lasting than those of a broken bone.

Much care and patience will be required in the management of sprains, the great point being to secure rest for the injured part. Should the knee or ankle-joint be involved, put the patient to bed and swathe the part in a hot-water dressing, or in compresses soaked with arnica or fluid extract of witch-hazel. When a joint of the upper extremity is involved, it is, of course, unnecessary to confine the child to bed; but at the same time the limb must be placed in such a position as to be as quiet as possible, while the local applications already mentioned should be employed. Later, passive motion must be practised in order to prevent permanent stiffness. A sprain, however, needs the surgeon's attention as much as a broken bone.

FRACTURES.

The breaking of a bone is indicated by deformity of the limb, such as bending, shortening, or twist-

ing, and when this occurs, much suffering to the patient and injury to the part may be saved by a little careful management. In lifting the child from the spot where the accident happens and carrying him to a bed, it should be one person's duty to support tenderly the injured limb, instead of allowing it to dangle loosely. Once in bed, lay it upon a soft, rather broad pillow; double this around the limb, and tie up tightly so as to afford protection from jars or shaking.

Beyond this, nothing should be undertaken until the physician arrives, except—in case of fracture of the lower extremity—the preparation of the bed. This consists in arranging a firm, though not too hard, mattress, with two or three under blankets for the sake of warmth.

CUTS.

These may be *clean*, as when made by a knife; *torn*, by a broken plate; or *abraded*, by a fall on hard, rough ground. If large and deep, the surgeon should be called at once. In trifling cases, the nurse must first thoroughly cleanse the wound by sponging it with hot water and then with an antiseptic solution of bichloride of mercury, 1 part to 3000, using a ball of absorbent cotton for a sponge. Any flow of blood should be checked by pressure, by the application of hot water, or—

should the hemorrhage be obstinate—by the use of a solution of alum. In the case of a knife cut, the next step is to press the edges together, fix them in this position by applying narrow strips of surgeon's adhesive plaster at short intervals across the wound, and cover the whole with antiseptic gauze. A torn wound may be dressed in the same way, but greater care is required to coadapt the edges. For abrasions, the best application is a piece of lint or absorbent cotton saturated with the bichloride solution already mentioned, fixed by a bandage. Neither dressing need be removed unless disarranged or in the event of suppuration taking place; in the latter case the wound must be washed with the antiseptic solution and redressed each day. When an artery is cut, the flow of blood must be checked by pressure on the vessel above the seat of injury; in the case of a vein, below it. Arterial blood flows in jets and is scarlet; venous blood runs in a continuous stream and is purple in color.

It is most important to remember that the bichloride solution is an active poison and that, consequently, it must be most carefully handled and guarded. It should be kept in a blue bottle labeled "Poison," and never left where there is the slightest risk of its being tasted and swallowed by the child or attendants, and never placed with the ordinary nursery medicines.

BURNS AND SCALDS.

The danger from burns or scalds is in direct proportion to the extent of surface involved and the depth of tissue destroyed. Fortunately, the majority of cases are trifling, and usually the hands or face are the parts that suffer. In these instances there are two things to be done: first, to relieve pain, and second, to encourage healing. To accomplish the former, apply a saturated solution of baking soda; for the latter use some mild ointment —fresh lard, for example—and keep the injured part protected from the air by a dressing of cotton batting.

Should the child's clothing take fire, remember that an upright position not only favors the spread of the flames, but encourages their approach to the neck and head. Any movement of the body, too, aids the flames by bringing fresh currents of air in contact with the burning materials. Therefore, do not let the child run about, but seize him, throw him down upon the floor and envelop his body closely in the hearth rug or a woolen tablecloth.

Should the child have fallen into a tub of scalding water, remove him immediately and undress him. In taking off the clothing, be careful to do it so gently as not to break the blisters produced by the moist heat; and should the underclothing stick anywhere to the surface, the garments must

be cut away piecemeal, leaving the adherent portions untouched.

After the above preliminaries put him, in either case, at once to bed. Next, prepare a number of pieces of old muslin corresponding in size with the injured areas, spread these with fresh lard or cosmoline, apply them and cover all with a thick layer of cotton batting and fix with bandages. Should the patient complain of cold hands or feet, or of faintness, a little whiskey or brandy may be administered and artificial heat applied to the extremities if these be uninjured. Nothing else should be done without the physician.

STINGS OF INSECTS.

Children, being more ignorant, are more frequently stung by bees, wasps, and other insects, than adults. Examine the wound the first thing with a magnifying glass, and if the sting be still in the tissues, extract it with a pair of tweezers, or squeeze it out by firm pressure in the neighborhood of the puncture. After this, apply aromatic spirits of ammonia or eau de Cologne. These will relieve the pain and itching. When the sting produces great pain and inflammation, apply a flaxseed poultice for twenty-four hours. The frequent use, afterward, of camphorated soap liniment will be productive of good results.

FOREIGN BODIES IN THE EAR.

When a foreign substance has entered the ear, the plan for its extraction depends somewhat upon the nature of the material. In any case, however, bend the child's head toward the affected side, cause him to open his mouth as wide as possible, and at the same time gently pull the external ear upward and backward. In this way the external canal of the ear is straightened and stretched to its widest extent, and a small body like a bead may drop out. Another method is to wash the foreign body away with warm water and a syringe. Should the substance be of a nature to increase in size by absorbing moisture, such as a pea or bean, its extraction must be left for the physician, though it is to be delayed no longer than absolutely necessary. When an insect enters the ear, the external canal must at once be filled with fresh olive oil.

FOREIGN BODIES IN THE EYE.

A simple plan for removing cinders and the like from the eye is to pull the upper eyelid forward and downward, by grasping the eyelashes, and direct the child to look upward. In this way the lashes of the lower lid are made to sweep over the inside of the upper one, and thus may brush away the foreign body. If this be unsuccessful, and if the offending substance be in sight, remove it with the corner of

a fine handkerchief. If not seen on the eyeball, it must be looked for beneath the lids. It is easy enough to pull down the lower lid and examine its internal surface; in the case of the upper lid, however, it is necessary to perform eversion; this is done by drawing the lid downward and forward, and turning it over a thin lead pencil (Fig. 25). Direct the child, in the meanwhile, to look down. When

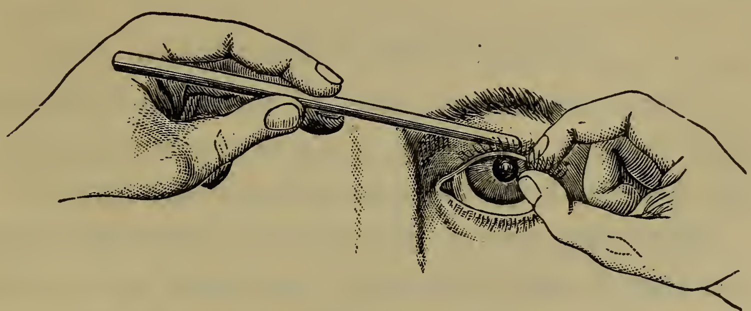

FIG. 25.—METHOD OF EVERTING UPPER EYELID.

the intruding body is disclosed by this process, it may be brushed away by a little cotton twisted upon the end of a match stick, or better by a small camel's-hair brush; the touch must be very gentle, and no prolonged effort made if the mote be imbedded. Treat any slight irritation following this accident and the process of removal by frequent applications of hot water.

FOREIGN BODIES IN THE NOSE.

Children frequently insert shoe-buttons, peas, beans, and other small objects into the nose. When these are not too firmly fixed, or have not been pushed too far up, they may be removed by closing the opposite nostril and causing the child to blow his nose forcibly. Should any difficulty be experienced, it is better to consult a physician than use persistent force.

FOREIGN BODIES IN THE THROAT.

A large, unchewed mass of food, a fish-bone, or some metallic substance, such as a piece of money, may become lodged at some point in the throat.

When this occurs, immediately insert the finger and thumb into the mouth, pass them as far down the gullet as possible, and if any object be felt, make an attempt to pull it forth.

Instead of lodging in the upper part of the gullet, the foreign body may be arrested midway in its course to the stomach. Let the child then partially masticate and swallow a piece of bread and several mouthfuls of water, which will probably assist the object's passage into the stomach; if not, medical skill will be required.

Foreign bodies, such as buttons and coins, that pass directly into the stomach, give rise to little trouble, and soon find their way through the ali-

mentary canal, and are voided from the rectum with the ordinary fæcal evacuations. Laxative medicines are never needed unless the bowels be absolutely confined, and then moderate doses of castor oil are the most suitable.

BLEEDING FROM THE NOSE.

Hemorrhage from the nose is sometimes so excessive as to lead to debility, or even threaten serious results. An injury or abrasion of the lining mucous membrane is the usual cause of hemorrhage, though it may result from certain constitutional conditions. To arrest the bleeding, put the child upon a bed, with the head and shoulders well elevated. First make pressure, with the thumb and index finger, on the root of the nose, *i. e.*, that portion between the eyes, or on either side of the nostrils where the blood-vessels ascending from the lip are felt to pulsate. Should this fail, plug the nostril from which the blood flows with a cone-shaped pledget of absorbent cotton or lint; this may either be dry or saturated with a solution of alum and water as hot as can be borne. The inhalation of the vapor of spirits of turpentine, or the immersion of the feet and legs in a hot mustard foot bath, are each successful in some cases. If the bleeding be obstinate, apply a piece of ice wrapped in flannel to the forehead or the back of the neck.

EARACHE.

Earache is a very common cause of crying in infancy and childhood. Screaming from earache may be distinguished from that due to pain in the bowels, another fruitful source of crying, by the former being more continuous, and by the child frequently carrying his hand to his head; again, in earache the passages from the bowels are natural, while in bowelache they are usually altered in character and offensive.

Put into the ear, for a short distance, a small piece of absorbent cotton saturated with a little warmed olive oil containing a few drops of laudanum; or, better still, with a four per cent. solution of cocaine. At the same time dry or moist heat may be applied to the external ear.

COLDS AND COUGHS.

A cold in the head is indicated by watery eyes, sneezing—with a discharge of mucus from the nose—and a nasal voice. Simple remedies are often efficacious. Frequently grease the forehead and bridge of the nose with mutton suet; insert a little vaseline in the nasal orifices, and, should the skin be hot, administer a mustard foot bath.

An ordinary cold—or, in medical language, a bronchial catarrh—is usually preceded by a cold

in the head, and is indicated by a hoarse cough, increased rapidity of breathing, and fever.

The methods recommended for colds in the head are also useful here. In addition, rub the chest thoroughly, three times a day, with a liniment of turpentine and sweet oil, one part to three; keep the child in one room at a temperature of 72° F.; allow a light diet, and summon medical aid.

SPASMODIC CROUP.

In this condition there is a mild grade of catarrh of the lining mucous membrane of the larynx, accompanied by marked spasm of the laryngeal muscles. This spasm is an outcome of the excessive reflex nervous irritability common to young children and gives rise to the characteristic features of the disease.

Spasmodic croup may occur during the first six months of life, but is most frequent from this age up to the third year, when the tendency gradually diminishes until after the fifth year attacks are unusual. While it occurs in both healthy and delicate subjects, some children possess a peculiar susceptibility, in which heredity seems to play a part. One attack predisposes to others. The exciting causes are exposure to cold, dampness, and high winds, overeating, and indigestion and constipation.

An attack may come on suddenly or be preceded

by hoarseness or by the symptoms of nasal catarrh. The precedent symptoms usually appear about midday and gradually increase. As evening approaches an occasional hollow, barking, evidently painful cough is noticed and the voice is very hoarse; toward midnight the cough becomes more brazen and more frequent and the breathing difficult. In very mild cases these disturbances are not severe enough to wake the child, but when the laryngeal spasm is marked, respiration becomes very labored, especially the inspiratory movement, which is attended by a hissing sound and by visible retraction of the soft parts above and below the breast-bone. Terrified by the want of air the child sits up in bed and struggles for breath. The face has an anxious expression; the cheeks are flushed, although the lips may be bluish, and the forehead is covered with drops of perspiration. The breathing is slow and labored and any excitement or effort increases the difficulty. The voice is hoarse but not lost. The cough has a characteristic brazen tone. The pulse is increased in frequency, and while the temperature may remain normal it is usually moderately elevated.

If untreated such an attack slowly disappears, and in the course of three or more hours the child, exhausted, drops to sleep. Next day, with the exception of hoarseness and an occasional barking

cough, nothing seems amiss; but in the late afternoon or near midnight the spasm returns and is even more severe than before, and after a second free day is apt to be repeated on the succeeding night, although this third attack is, as a rule, much less severe than the others.

The treatment of an attack of croup must be left to the physician, but a mother can do much in the way of prevention. When the susceptibility exists, the child must be carefully guarded against exposure to cold, high wind and dampness; must be properly fed, never allowed to become constipated, and everything known to induce an attack must be rigidly avoided. Plenty of outdoor life and fresh air, under proper restrictions, are to be recommended. All local excitant conditions—as adenoid growths or hypertrophied tonsils—should receive attention, and if there be general ill health and want of tone, the system should be built up by food and tonics.

Upon the onset of hoarseness and a croupy cough, syrup of ipecacuanha should be given in doses of 3 to 5 drops in a little sweetened water every two hours, and the throat and anterior part of the chest thoroughly rubbed with camphorated oil every four hours.

When an attack occurs—before the arrival of the physician—hot compresses should be applied to

the region of the larynx, and sufficient syrup of ipecacuanha administered to secure free emetic action, and in this way relax the laryngeal spasm—15 to 20 drops every fifteen minutes, for three or four doses, with intermediate draughts of warm water, will usually accomplish the result quickly. At the same time moistening the air of the chamber with vapor from a croup-kettle will add greatly to the comfort of the patient.

VOMITING.

The most healthy infant, even though it be fed at a normal breast, often expels a portion of each feeding. This is an act of regurgitation rather than vomiting, and is, in reality, a natural method of relieving an overburdened stomach.

Vomiting proper is preceded by the sensation of nausea; is followed by lassitude, and is often attended by fever. It indicates some disorder of the stomach. For its relief, perfect rest for the whole body; several hours' starvation, or rest for the stomach, and a reduction in the quantity and strength of the food, are necessary. Bits of ice, soda-mint, lime-water, and a mixture of equal quantities of cinnamon-water and lime-water, in teaspoonful doses, are simple and efficient remedies; a weak mustard plaster placed over the pit of the stomach is always useful. Should the symptom be obsti-

nate, however, the case becomes too serious for the mother to manage on her own responsibility.

COLIC.

Colic is a very common affection of infancy. It usually occurs in the period between birth and the end of the third month, and gives rise to much discomfort, both to the infant and its attendants, by causing fretfulness, crying and wakefulness. The treatment is very much one of diet and properly prescribed drugs. Still, there are some domestic remedies which may be used safely and with success. Thus, the abdomen should be anointed twice a day with warm olive oil and enveloped in a broad flannel binder. It is even more important to keep the feet warm, and for this purpose thick socks or long woolen stockings should be worn, and, in bad cases, artificial heat must be applied by hot-water bottles. Medicines are indicated chiefly during attacks of pain. A serviceable prescription is ten drops of gin in a teaspoonful of sweetened warm water, or a small teaspoonful of hot soda-mint. It is also well to administer five to ten drops of essence of pepsin or of diazyme essence after each nursing.

When a paroxysm of pain is violent enough to lead to depression of the fontanelle and threaten collapse, place the infant in a warm bath for five minutes. After removing and carefully drying

him, wrap him in a blanket; put a flax-seed poultice with a little mustard flour over the abdomen; apply a hot-water bottle to the feet; relieve the bowels by an enema of warm water, and by the mouth give him ten drops of gin or brandy in warm water. If the fontanelle still remains depressed, continue the stimulant in doses and at intervals proportioned to the urgency of the symptoms.

CONSTIPATION.

Habitual constipation is such a common occurrence in infancy and childhood that it warrants a somewhat detailed consideration. The methods that may safely be employed to clear the lower bowel of accumulated fæces, or, in other words, to relieve the actual state of constipation, will be first noticed, for this is always a necessary step when there is painful straining, and in case there has been no movement for a day or more. For this purpose injections are most efficient, and when given with care are entirely free from danger.

A serviceable plan is to inject into the rectum, according to the age of the patient, from one to four teaspoonfuls of warm olive oil; allow it to remain for six hours, and then use one or more injections of table salt and warm water. The preliminary injection of oil softens the fæces, while the subsequent ones have the additional effect of distending

the walls of the rectum, thus bringing about muscular contraction and expulsion of its contents. Should a compact fæcal mass be present at the anus and be too bulky to escape—a condition often visible during straining—more liquid must be injected, and if this fails the mass must be broken up by the finger and its passage assisted by gentle pressure upon the parts behind the anus while expulsive efforts are being made. The process of breaking up is easy, as the anus is widely distended at such times. In obstinate cases little result may follow a single administration of the injections, though a course of one or two oil injections and purgative enemata for several successive days rarely fails to empty the bowel.

The best syringe for children is one of hard rubber with a long, smooth nozzle, having a capacity of six or eight fluidounces. When oil is injected, the intention being to have it remain in the rectum and act mechanically on the fæces, its retention is best secured by firmly pressing a warmed pad of flannel against the anus for five minutes after the insertion, the patient, in the meanwhile, lying upon his back. The laxative enemata must vary in bulk with the age of the child, or, in other words, with the capacity of the rectum; two fluidounces (four tablespoonfuls) will be sufficient for an infant of six weeks, while from four to eight fluidounces are

required at the age of two years. The quantity of salt to be used must depend upon the quantity of water—half a teaspoonful of salt to eight ounces of water being the proper proportion. After drawing the fluid—which must be tepid—into the syringe, grease the nozzle well and gently insert it into the anus, directing the point a little toward the patient's left; next slowly force the piston until all the liquid is expelled or complaints of pain indicate that the bowel is sufficiently distended. If it be possible to force retention for a moment or two by pressure on the anus, the movement will be freer and easier than if the fluid be allowed to flow away at once. The best positions for the child are either on his back with his legs well drawn up, or resting on his abdomen across the nurse's lap.

Injections of glycerin and glycerin suppositories are also very useful for the purpose of unloading the lower bowel. When glycerin is employed, the quantity to be injected varies from one to two teaspoonfuls, according to the age of the child, and should be diluted with an equal quantity of pure water. The best instrument to use is the bulb syringe, previously recommended (page 236).

For the prevention of further constipation the diet must be regulated according to the rules given in Chapter IX, and besides regulating the food and hours for meals, bathing, sleep, exercise and cloth-

ing, care must be taken to establish fixed habits of defecation.

In my experience the youngest infant can be taught to use a chamber, and if this vessel be presented each day at the same hour he soon falls into regular ways. Should faulty habits be established or constipation exist, resort to injections and abdominal massage at the same hour each day.

After the third year the best period of the day for the bowel to be moved is immediately after breakfast, and no call of duty or pleasure should be allowed to interfere. When constipation is to be overcome natural efforts must be made then. These efforts may at first be ineffectual, but much can be accomplished by perseverance in a daily, sustained effort, for about ten minutes. When this plan fails, use injections or other methods of relief, taking care to keep to a certain hour, that the formation of a habit may be encouraged.

Thorough rubbing of the abdomen is often successful in inducing a movement of the bowels. Gentle pressure should be made with the palm of a well-warmed hand, and the movement directed, first, from the brim of the pelvis on the right side, upward to the rib margin, then across from the right to the left, and finally downward on the left side from the margin of the ribs to the brim of the pelvis again. Such manipulation excites peri-

staltic action, and encourages the passage of the intestinal contents along the large bowel toward the anus. Ten minutes is quite long enough to continue the rubbing. The manipulation may be rendered more effective by using warm sweet oil as an inunction.

With children of six years and upward, daily cold spongings of the body are very beneficial, followed by frictions with a coarse towel until the surface is red.

Manna, phosphate of sodium, and soap suppositories are among the medicines that may be safely used in the nursery.

Manna, which imparts a sweet taste, may be dissolved in the food, and given from the bottle as often as required; a piece as big as a pea, once, twice, or three times a day, will be sufficient for an infant of six months.

Phosphate of sodium—an admirable laxative—can also be administered with the food; five or ten grains, three times daily, is the proper dose at the same age.

Soap suppositories must vary in strength with the age. At two months one grain of soap to ten grains of cocoa butter is the proper proportion; at one year the quantity of soap may be increased to five grains in each suppository, and so on. A substitute for soap suppositories may be prepared

in the nursery, as follows: Cut from a bar of good castile soap a piece two inches long and half an inch thick. Scrape this into a cone, pointing one end like a sharpened pencil, but with a blunter point and more gradual slope; make it quite smooth by rubbing the surface with a wet rag (Fig. 26). When the soap stick is used anoint the pointed

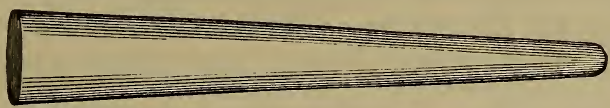

Fig. 26.—Soap Stick.

end with vaseline and gently insert it into the rectum and hold it there until the action begins. It is not desirable to leave any fragments of soap in the rectum.

CONVULSIONS.

Convulsions arise from so many diverse causes that it is impossible to indicate more than what is to be done during the fit and prior to the arrival of the physician.

When the attack comes on, the child must be undressed at once and plunged into a hot bath for five minutes; this bath must contain enough mustard flour to stimulate the skin thoroughly. This usually restores consciousness and checks the muscular twitching. Should there be a distinct history of overloading of the stomach, give an

emetic of ipecacuanha, and after this has operated, a purgative dose of castor oil. One or more doses of bromide of potassium, five to ten grains, according to the age, may also be safely given; this salt must always be administered in solution.

A CHILL.

This is always a serious occurrence and warrants sending for the doctor. Before his arrival, put the child to bed, surround him with bottles containing hot water, place a moderately strong mustard plaster over the abdomen or over the region of the heart, and administer whiskey and hot water in small doses and at short intervals.

The ailments of children do not so frequently begin with a chill as do those of adults, but when they do, it is a more decided indication of the future gravity of the attack.

FEVER.

It is not my intention here to refer to the management of the essential fevers, for I hold that neither mother nor nurse is capable of managing them without professional assistance. However, the following tables, exhibiting the features of the eruptive fevers and other contagious diseases, will answer some of the questions which so frequently suggest themselves to the minds of anxious mothers.

ERUPTIVE FEVERS.

Name.	Period of Incubation.	Day of Rash.	Character of Rash.	Rash Fades.	Duration of Illness.	Duration of Contagiousness.
Measles.	10 to 14 days.	4th day of fever, or after 72 hours' illness.	Small, dull red pimples, appearing behind the ears and on face.	On 7th day of fever.	9 days.	From first day, for exactly 3 weeks.
Scarlet Fever.	2 to 7 days.	2d day of fever, or after 24 hours' illness.	General rosy blush appears first about neck and shoulders.	On 5th day after fever.	8 or 9 days. (This does not include sequels.)	Six weeks at least.
Typhoid Fever.	10 to 14 days.	7th to 14th day.	Rose-colored, slightly elevated spots, few in number, chiefly on abdomen.	. .	14 to 21 days.	Not contagious.
Chicken-pox.	12 to 17 days.	2d day of fever, or after 24 hours' illness.	Appears in crops on back and abdomen, small, red papules rapidly passing into globular vesicles.	Thin scabs form about 4th day of fever.	7 to 12 days.	First day, for three weeks, or a full week after all dry crusts have disappeared.
Small-pox.	12 days.	3d day of fever, or after 48 hours' illness.	Small, hard, red pimples, becoming vesicles, then pustules, appearing first on face and neck.	Scabs form on 9th or 10th day of fever, and fall off about the 14th.	14 to 21 days.	First day, for about 6 weeks.

OTHER CONTAGIOUS DISEASES.

Disease.	Period of Incubation.	Date of onset of characteristic symptoms from invasion.	Characteristic Symptoms.	Duration of Illness.	Duration of Contagiousness.
Erysipelas.	3 to 7 days.	1st or 2d day.	Redness, glossiness, and puffiness of affected skin; area circumscribed, pitting and painful to pressure, and seat of burning and smarting pain. Fever.	5 to 7 days; several weeks in cases that extend.	From 1st day for 2 weeks.
Diphtheria.	2 to 5 days.	1st or 2d day.	False membrane on tonsils and other parts of throat.	Depends upon date of beginning antitoxin injections.	From first day for 4 to 6 weeks but depends upon results of throat cultures.
Whooping-cough.	7 to 14 days.	2 to 4 weeks.	Paroxysmal cough followed by a crowing inspiration. Paroxysms often end with the expulsion of glairy mucus or vomiting.	12 weeks.	From onset of initial catarrhal symptoms for 12 weeks, or until whoop ceases. Most contagious during whooping stage, 4th to 10th week.
Mumps.	17 to 20 days.	1st day.	Swelling in front, below and behind the ear, sometimes below the jaw; pain on movement of jaw or neck, and on swallowing.	7 to 14 days.	From one day before symptoms appear, for 3 weeks.

It may be well to give a few directions as to the management of a fever before the arrival of the physician. Every fever—whether it be due to a poison circulating in the blood or to a passing irritation of little or no moment—is attended by the following symptoms: heat of skin, lassitude, loss of appetite and thirst. When these features arise, the mother must be on her guard and take steps to place her charge in the best possible condition. First give the child a mustard foot bath;* then put him to bed with only sufficient covering to keep up a normal body temperature. Reduce the diet to the simplest possible basis, milk food being the safest. A moderate quantity of pure water or of some effervescing saline water may be allowed. Febrifuges, as aconite, or even sweet spirits of nitre, had best not be given without advice, and quinine or other remedies are not to be trifled with.

Should headache be severe, place cold compresses upon the forehead, or a weak mustard plaster (one part of mustard to six of wheat flour) on the nape of the neck.

Free urination should be encouraged by hot compresses over the bladder, and it is well to secure a free action of the bowels by a mild saline laxative.

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*See page 133.

CONTAGIOUS DISEASES AND DISINFECTION.

There are certain points connected with the nursing of contagious diseases and the subject of disinfection that are worthy of mention.

In every case of contagious disease, allow in the room only those who are necessary to nurse the sick. The nurse must avoid overfatigue, have regular meals of digestible and nourishing food, and fixed hours for sleep and relaxation. The chamber selected for the sick-room should be large, well ventilated, and as near the top floor of the house as possible. Upholstered and stuffed furniture, curtains, hangings, carpet and other articles capable of holding disease germs, are difficult to disinfect, and should be removed before the entrance of the patient; in fact, to put this matter in a nutshell, the sick-room should contain only such furniture as will be absolutely needed by the patient and nurse. Scrupulous cleanliness is essential. Remove dirty dishes, vessels with discharges, soiled napkins, and the like, at once.

Disinfectants are substances that destroy the infective power of infectious materials, and must not be confounded either with antiseptics, or arrestives of putrefaction, or with deodorizers, or neutralizers of bad smells.

In the use of disinfectants, it is important to bear in mind that contagious virus must be destroyed at

its source. As this, of course, is the *body* of the sick, all discharges must have their power for evil destroyed as soon as possible. Receive discharges from the mouth and nose, especially in cases of scarlet fever and diphtheria, in bits of rags, and burn them immediately after use. When the skin is affected, as in scarlet fever, for example, the flakes that fall away are highly infective. To prevent these becoming disseminated, the surface should be anointed several times a day with vaseline, lard or cocoa butter, all of which substances will be rendered more efficient by the addition of carbolic acid (1 to 40). After recovery from scarlet fever the child, before breaking quarantine, should be thoroughly scrubbed with soap and water, and then sponged with a solution of carbolic acid in water (1 to 50) or of bichloride of mercury (1 to 5000) and finally washed in pure water. Two such baths, given at an interval of about twenty-four hours, are usually quite sufficient, and after each bath fresh clothing must be put on. The patient's hair must be cut short and the scalp cleaned and disinfected.

Articles used about the patient, such as sheets, pillow-cases, blankets and clothes, should not be removed from the chamber until they have been soaked for at least an hour in the following disinfecting fluid:

Sulphate of zinc............8 ounces.
Carbolic acid...............1 ounce.
Water.....................3 gallons.

After this, place the soiled articles in boiling water for washing.

Articles not requiring to be frequently changed, such as pillows and mattresses, need disinfection. This may be done at the termination of the sickness, and is best accomplished by steam, or, if this be impossible, they must be burned.

Keep a small quantity of the above fluid or of a solution of corrosive sublimate (1 to 1000) in all vessels provided for receiving the discharges of the patient, and, after these are used, empty quickly and clean with boiling water. Water closets or privy wells into which these discharges are poured must also be disinfected each day with a solution of copperas (one pound to the gallon). In case of scarlet fever and diphtheria the floor of the sick-room should be washed once each day with a solution of bichloride of mercury (1 to 2000) and the walls and furniture near the patient wiped frequently with cloths moistened with the disinfectant. In diphtheria a tray of carbolic acid solution (1 to 40) should be at hand for spoons, syringes, or other instruments employed in the treatment; and spoons, cups and dishes used in feeding must be carefully sterilized by boiling for twenty minutes.

Fumigate the sick-room as soon as the patient leaves it. To do this, tightly close the room and stuff all apertures, such as keyholes, loose window sashes, spaces under doors and so on, with cotton or rags. Then, by means of a lamp provided for the purpose, or by a Lister fumigator, the air is saturated with formaldehyde gas and the room kept closed for at least twelve hours and then thoroughly aired.

Wood-work and walls, if painted, should be wiped down with a solution of bichloride of mercury (1 to 2000) and then scrubbed with soap and hot water, and the floor should be thoroughly scrubbed with the same solution. Repapering and fresh painting are necessary after cases of scarlet fever or small-pox.

The person of the nurse may be disinfected in the way already indicated for the patient.

Both milk and water will carry disease germs, and hence both must be sterilized when there is any danger of their being contaminated. Never give delicacies or articles of food that have stood in the sick room to other members of the household.

VARIOUS DRESSINGS.

POULTICES.

Poultices may be made with corn-meal, bread, starch, ground slippery elm, flax-seed meal, or, in

fact, any material that will retain heat and moisture. Flax-seed meal is usually selected because it is bland and non-irritating; because it contains considerable oil, which gives it great heat-retaining properties, and because it is cheap.

All poultices should be large, from half an inch to an inch thick, applied as hot as can be borne, and renewed as soon as cold. A covering of oiled silk or thin rubber cloth is useful to prevent rapid cooling and drying.

FLAX-SEED POULTICE.

Take a perfectly clean bowl, pour in the requisite quantity of boiling water, then add the flax-seed meal slowly, stirring continually with a large spoon to prevent the formation of lumps, until it becomes stiff enough not to run freely. Spread between two layers of old muslin, folding the edges over so as to avoid soiling the part to which it is applied.

THE JACKET POULTICE.

The jacket poultice, so often employed in cases of pneumonia, requires some skill in its preparation.

For a child from one to three years old, use about a pound of flax-seed meal in each poultice.

Take a piece of muslin or a large towel long enough to go entirely around the patient's chest, and of sufficient width, when folded on itself, to extend

from the collar-bone to a few inches below the lower end of the breast-bone. After the meal is properly mixed, spread it evenly over one entire half, lengthwise, of the cloth, which should then be folded over. Place this around the chest, with the open edge upward, and fasten behind. It should be held up by a tape passing over each shoulder.

Put this poultice on as hot as the nurse can tolerate it against her cheek; cover with oiled silk and renew every three or four hours. When the cool poultice is to be removed have a hot fresh one ready for immediate application.

COTTON JACKET.

This dressing has almost supplanted the jacket poultice in the treatment of pneumonia in children, because it is more readily applied, is much lighter and consequently interferes less with the respiratory movements of the chest wall, maintains a more uniform temperature, requires changing less frequently, thereby avoiding fatigue and exposure, and is capable of gradual removal by thinning the cotton from time to time.

A muslin waist or a merino undershirt forms the frame of the cotton jacket. If a shirt be used it must have the sleeves cut off, be opened all the way down in front, and so arranged that when put on it may be closed by tapes. A waist should reach

well up in front and behind, and down to the base of the chest, and be fastened over the shoulders and in front by tapes. To the inside of either frame, a thick layer of cotton must be basted, and to the outside a complete covering of oiled silk. Such a jacket need not be changed oftener than once in twenty-four hours, and may be worn much longer if the cotton does not become too saturated with perspiration or rolled into hard balls by the restless movements of the patient.

BREAD POULTICE.

Make a bread poultice by soaking a muslin bag filled with bread crumbs for a few minutes in boiling water, then squeeze it gently between two towels until it does not drip.

CHARCOAL POULTICE.

The charcoal poultice is useful in foul and sloughing sores, and is prepared by incorporating some powdered charcoal with a flax-seed, a corn-meal or a bread poultice, and then sprinkling the surface with more charcoal.

PLASTERS.

MUSTARD PLASTER.

These plasters are used for the purpose of making counterirritation, and must be graduated in strength

according to the tenderness of the skin and the end to be accomplished. Pure mustard is very irritating and will quickly blister the tender skin of a child. Flour is the ordinary diluent, and the strength of the plaster usually ranges from one part of mustard to three, six, or even more parts of wheat flour.

In making the plaster, take one teaspoonful of mustard flour and add to it three teaspoonfuls of wheat flour; mix them together thoroughly on a plate, and put on as much hot water (never vinegar) as may be necessary to make a soft mass. Spread evenly over a piece of muslin. To prevent the mustard from adhering to the skin, place a piece of gauze or thin muslin over the surface of the plaster; turn down the edges as in poultices.

Remove the plaster after the surface becomes quite red.

SPICE PLASTER.

Take equal parts of ground ginger, cloves, cinnamon, and allspice, and one-fourth part of cayenne pepper; mix the ingredients together on a plate; put the whole into a flannel bag about as large as the hand, and wet with hot whiskey or alcohol.

After the bag is filled it is better to quilt it; otherwise, as it is usually worn some length of time, the ingredients are apt to fall together in a lump.

DRY, HEATED APPLICATIONS.

Make a bag of thick flannel, somewhat larger than the part to be covered. Half fill it with hot bran, hops, chamomile flowers, or whatever is to be used. Apply to the part on which it is intended to act. Retain it there by a bandage. When the bag and contents become cooled, quickly remove, substituting a few thicknesses of hot flannel until the bag can again be heated by placing it on a tin plate in the oven, or by holding it over burning coals, being careful, of course, not to scorch it.

COLD-WATER DRESSING.

Take a piece of clean old linen or muslin large enough to cover the affected part. Thoroughly wet with cold water. Keep constantly wet by redipping in the cold water, or by gently squeezing out a wet sponge on the cloth, so as to keep it wet without dripping. The latter plan is the better, as it causes no disturbance of the parts beneath,—an important consideration in many cases.

HOT-WATER DRESSING.

The hot-water dressing is prepared in the same way as the above, substituting hot water for cold water, and covering with oiled silk.

FLANNEL DIPPED IN SPIRITS.

Take a piece of old, soft flannel; heat it before the fire; then fold it to the size and shape required; dip into hot water and wring it dry. While this is being done by one person, some one else should put some common whiskey into a shallow dish over the fire, and heat it, being careful that the whiskey does not take fire. As soon as thoroughly heated, dip the flannel into it and squeeze out any excess of spirits, which would merely drip away, to the annoyance of the patient. Have the surface exposed, and rapidly apply the flannel as hot as can be borne. Over this place another piece of dry flannel which has been heated quite hot and folded like the first one. If desirable, a bandage may be brought around to secure them in position. As soon as the inner flannel, which was dipped in the whiskey, has become somewhat dry, another one should be prepared at once and applied in its stead.

TURPENTINE STUPE.

A turpentine stupe is made by wringing a piece of soft flannel out of hot water and sprinkling a few drops of warm spirits of turpentine on it. It should be covered with oiled silk while applied, and removed when sufficient irritation of the surface is produced.

ADMINISTRATION OF MEDICINE.

The administration of medicine often requires considerable skill, and is a task in which more clumsiness than tact is often exhibited. Teach the nurse that a child cannot swallow as long as the spoon is between the teeth, but that it is advisable to depress the tongue a brief moment and withdraw the spoon as soon as emptied.

Should the child rebel, there are many ways by which he can be diverted, so that he shall swallow his medicine before he knows it. Also, should he have a fondness for any special thing, such as sugar, jelly, etc., the taste of the medicine may be quite hidden by mixing it with the thing he loves.

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